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May 1994

# PC Computing

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# PC Computing



## 104 Pennywise Pentiums

BY PRESTON GRALLA

You gotta have that multimedia Pentium, but the boss won't buy it. Tried the price argument? Superfast, fully outfitted multimedia Pentiums (with dual-speed CD-ROM drives, 17-inch monitors, and 16-bit sound cards) now cost less than ever. The prices have plunged so much that 486s hardly make sense anymore. How cheap are they? By the time you finish reading our test results, they'll probably be even cheaper.

## 134 Norton Desktop vs. PC Tools

BY SCOT FINNIE

Welcome to the Duel of the Desktops. Norton Desktop 3.0 for Windows and PC Tools 2.0 for Windows—the two leading Windows desktop enhancements—squared off

### PC TOOLS 2.0 FOR WINDOWS

Memory	Resources	Drive C	Drive D
26,593 KB	62%	39,976 KB	186,320 KB

in our Usability Labs. We subjected the two products to hundreds of hours of testing by real business users just like you. When the dust settled, one claimed top honors in nearly every category. And as you'll see, it takes a lot more than window dressing to dress up Windows.



NORTON DESKTOP 3.0 FOR WINDOWS

## 160 Silent Software Partners

BY STEVE DITLEA

Who would you rather have as your personal aide? Barney Fife, the bumbling deputy sheriff of Mayberry? Or Radar O'Reilly, the super-efficient company clerk of *M.A.S.H.*? If today's software wizards are Barney, then tomorrow's intelligent software agents are Radar. Tomorrow's sidekicks—we call them silent partners—will take over entire computing tasks for you. From General Magic to Microsoft, from Lotus to Borland, here's a look at who's developing what and when to expect it.



## 36 Ultra Slim, Ultra Fast

BY MIKE E. HOGAN

Wanna see our DX4 notebooks? Wanna see them again? These screamers from Texas Instruments and Toshiba—the first two 75MHz notebooks to hit the market—smoked our benchmarks. And their battery lives weren't half bad either. In New!



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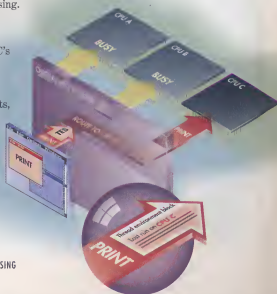
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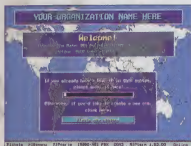


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### The Best 200

What hardware is absolutely, positively, without a doubt the best you can buy? Whatever it is, you expect it to rate high among hard-core users. To be labeled the best in the business, a product better pass our performance tests with flying colors, be packaged with solve-all-technical-problems documentation, and provide first-rate service and support.

But with thousands of hardware products to choose from, how do you know which is best? After four months of rigorous research, our staff of lab technicians and editors came up with the definitive list of the best 200 hardware products on the market. In this comprehensive roundup, we'll arm you with a one-stop buyer's guide to making sound purchase decisions. Find out how 21 categories of hardware, from file servers to tape backup drives, were ranked and numerically scored to bring you the winners—the best hardware on the market. Whatever you do, don't miss this issue; the future of your business depends on it.

### Coming in June Help

Brian Livingston discusses the Windows Registration Database where Windows keeps track of your applications. Ed Bott shows how virtual device drivers and dynamic link libraries work, and which you can delete to free up disk space. Plus, Ron White explains the vagaries of plug and play.

### Coming in June New!

- Access 2.0: The Ultimate Windows Database?
- The latest 486 and Pentium superfast desktops from major vendors.
- Bit Blasters: 64-bit video cards.
- More Internet tools for the PC.

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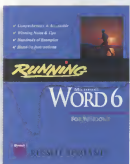
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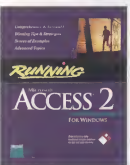
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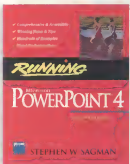
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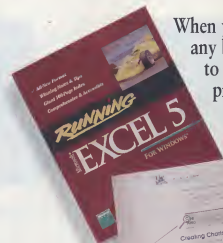


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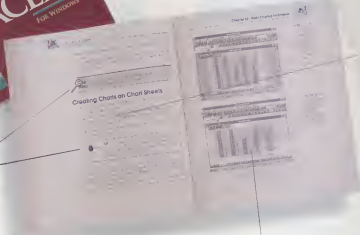


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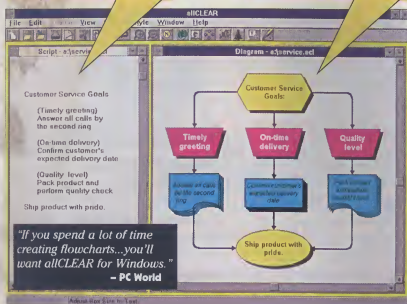
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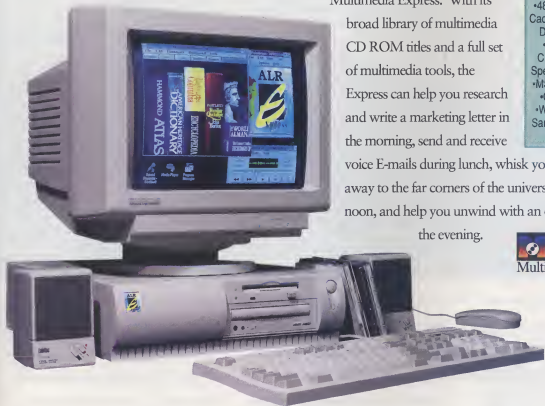
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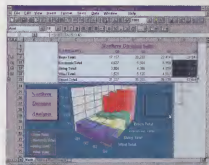


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But what do you do when a good metaphor goes bad? That's exactly what has happened with the Information Superhighway. It first appeared as a catchy little phrase to get a difficult conversation started: "Think of this enormous web of interconnected data networks as a giant superhighway. . . ."

## Then It Got Completely out of Control

Now you can't pick up a newspaper or watch CNN without getting traffic updates on the Information Superhighway. There are potholes and roadblocks and traffic cops and billboards. There are on-ramps and interchanges and toll roads and long-distance trucks. Do I need a driver's license to get on the superhighway? Can I get a modem with a virtual air bag? Do friends let friends drink and download? With all the fog along this stretch of road, visibility has dropped to nearly zero.

If somebody doesn't stop this nonsense soon, we'll end up as roadkill on the Information Super-please-don't-make-me-say-it-again.

Besides, this fixation on a worn-out metaphor obscures the real issues associated with the way we use computers to share information and ideas—like the right to privacy, the right to free expression, and the ability to compete in business on a level playing field.

The next time someone at a cocktail party mentions the Information Superhighway and interactive television in the same sentence, steer the conversation in a more intelligent direction. The I— S— is not about putting Kmart on cable or zapping yet another Steven Seagal movie into your living room on demand. It's about access to information—facts, figures, and opinions on everything from nanotechnology to big business. And the Internet is the best way to tap into the collective consciousness of the thinking world.

If you haven't used the Internet, just wait. You will. If you haven't begun to think about the future of the Internet, maybe you should. Here are some of the questions we need to ask.

**Who runs the Internet?** Nobody built the Internet—it built itself. The enormous web of interconnected data networks that is the Internet has reached an evolutionary flash point. It started more than 20 years ago as a way for researchers to share precious computing resources and information. Since then, its growth curve has been like the takeoff run of a 747:

a long, lumbering acceleration that's about to head straight up. With nearly 2 million new users a month, some predict that three years from now there will be 100 million people worldwide with active Internet connections.

Most of these new users will involve business accounts, unlike the academic and government accounts (funded with tax money) that drove the early growth of the Internet. Is it reasonable to expect MIT and Carnegie-Mellon to continue to shoulder the administrative burden of a mostly commercial Net? Not likely. So who takes over and runs it like a business? Ted Turner? Barry Diller? Al Gore? Whether you choose corporate takeover or government bureaucracy, the days of the Internet as information commune are nearly gone.

## Who pays for the Internet?

On the decentralized Net, clients don't pay for anything except the wires and boxes. Want to rummage through the Library of Congress Information System or check the FDA's list of approved drugs? No one will present you with a bill. In fact, until recently *any* commercial activity on the Internet was expressly forbidden. But that's about to change.

Earlier this year, Ford Motor's Lincoln-Mercury Division announced that it will advertise on the new 24-hour "Electronic Car Showroom" on the Internet. Given the American tendency to stuff every empty space with commercials, that's just the opening salvo. If we don't pay attention, we may wake up one day to discover that entrepreneurs have turned the richest source of information in the free world into something very expensive.

**How secure is the Internet?** The Internet is not an interstate. It's more like a complex network of surface streets and back roads, where the shortest distance between two points is rarely a straight line. My packets of data may pinball through a dozen or more Internet nodes before they reach



*We should deal with the reality instead of the mindless metaphor.*

their destination. So what's to stop a complete stranger from picking off those packets as they pass by? Encryption is the easy answer. Except that the Clinton administration, with its support of the Alice-in-Wonderland Clipper Chip initiative, wants a copy of the keys to any advanced encryption system. And if you leave the keys to your data at the front gate of the White House, you might as well publish it in the *Washington Post*. Send a letter—better yet, send an e-mail message to the White House if you care about your right to privacy.

No, the Internet is not a superhighway. It's miles of wire with billions of electrons zipping along it every hour. And the sooner we start dealing with the reality instead of the mindless metaphor, the sooner we'll all be able to start using it—and improving it. ■



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- 340MB local bus IDE hard drive, 128K cache
- 2X CD-ROM drive, 3.5" 144MB FDD
- PCI Local Bus Graphics with 1MB
- ZEOS 14" color monitor, 1024 NI, .28mm
- 6-bay desktop case
- 3 PCI local bus, 5 16-bit ISA slots
- Integrated business audio
- 200-watt power supply with surge suppression
- 101-key keyboard, mouse
- MS-DOS 6.2 w/Tools, Windows For Workgroups 3.11
- Choice of Lotus Windows application

**Pentium-60 \$2595**

**Pentium-66 \$2795**

### PENTIUM-60/66

- Intel 60MHz or 66MHz Pentium CPU
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- PCI Local Bus Graphics with 1MB
- ZEOS 15" color monitor, 1024 NI, .28mm
- 6-bay desktop case
- 3 PCI local bus, 5 16-bit ISA slots
- Integrated business audio
- 200-watt power supply with surge suppression
- 101-key keyboard, mouse
- MS-DOS 6.2 w/Tools, Windows For Workgroups 3.11
- Choice of Lotus Windows application

**Pentium-60 \$3095**

**Pentium-66 \$3295**



#### 486DX-33/DX2-66

- Intel 33MHz 486DX or 66MHz 486DX2 CPU
- 8MB RAM, 128K SRAM cache
- 340MB IDE hard drive, 128K cache
- 3.5" 1.44MB floppy drive
- Local Bus Graphics with 512KB
- ZEOS 14" color monitor, 1024 NI, 28mm
- 4-bay slim case
- 2 VESA local bus & 3 16-bit ISA slots
- 200-watt power supply
- 101-key keyboard, mouse
- MS-DOS 6.2 w/Tools, Windows For Workgroups 3.11

**486DX-33 \$1595**

**486DX2-66 \$1795**

#### 486DX2-50/DX2-66

- Intel 50MHz or 66MHz 486DX2 CPU
- 4MB RAM, 128K SRAM cache
- 426MB IDE hard drive, 128K cache
- 3.5" 1.44MB floppy drive
- Local Bus Graphics with 1MB
- ZEOS 14" color monitor, 1024 NI, 28mm
- 4-bay slim case
- 2 VESA local bus & 3 16-bit ISA slots
- 200-watt power supply
- 101-key keyboard, mouse
- MS-DOS 6.2 w/Tools, Windows For Workgroups 3.11

**486DX2-50 \$1695**

**486DX2-66 \$1795**



#### 486DX2-66/DX4-100

- Intel 66MHz 486DX2 or 100MHz 486DX4 CPU
- 16MB RAM
- 528MB local bus IDE hard drive, 256K cache
- 2X CD-ROM drive, 3.5" 1.44MB FDD
- Diamond SpeedStar Pro Local Bus Graphics with 1MB RAM
- ZEOS 14" color monitor, 1024 NI, 28mm
- 6-bay desktop case
- 2 VESA local bus, 5 16-bit ISA and 1 8-bit ISA slot
- 200-watt power supply with surge suppression
- EPA Energy Star compliant
- 101-key keyboard, mouse
- MS-DOS 6.2 w/Tools, Windows For Workgroups 3.11
- Choice of Lotus Windows application

**486DX2-66 \$2595**

**486DX4-100 \$2995**

#### 486DX2-66/DX4-100

- Intel 66MHz 486DX2 or 100MHz 486DX4 CPU
- 8MB RAM, expandable to 64MB
- 256K SRAM system cache
- 528MB local bus IDE hard drive, 256K cache
- 2X CD-ROM drive, 3.5" 1.44MB FDD
- Diamond Viper Local Bus Graphics with 1MB RAM
- ZEOS 15" color monitor, 1024 NI, 28mm
- 14.4 bps V32 bis send/receive fax modem
- 6-bay desktop case
- 2 VESA local bus, 5 16-bit ISA and 1 8-bit ISA slot
- 200-watt power supply with surge suppression
- EPA Energy Star compliant
- 101-key keyboard, mouse
- MS-DOS 6.2 w/Tools, Windows For Workgroups 3.11
- Choice of Lotus Windows application

**486DX2-66 \$2695**

**486DX4-100 \$3095**

#### PENTIUM-66/90

- Intel 66MHz or 90MHz Pentium CPU
- 16MB RAM, 256K SRAM cache
- 528MB local bus IDE hard drive, 256K cache
- 2X CD-ROM drive, 3.5" 1.44MB FDD
- Diamond Viper/PCI Local Bus Graphics with 2MB
- ZEOS 15" color monitor, 1024 NI, 28mm
- 10-bay vertical case
- 3 PCI local bus, 5 16-bit ISA slots
- Integrated business audio
- 200-watt power supply with surge suppression
- 101-key keyboard, mouse
- MS-DOS 6.2 w/Tools, Windows For Workgroups 3.11
- Choice of Lotus Windows application

**Pentium-66 \$3495**

**Pentium-90 \$3695**

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- PCI Local Bus Graphics with 1MB
- ZEOS 15" color monitor, 1024 NI, 28mm
- 6-bay desktop case
- 3 PCI local bus, 5 16-bit ISA slots
- Integrated business audio
- 200-watt power supply with surge suppression
- 101-key keyboard, mouse
- MS-DOS 6.2 w/Tools, Windows For Workgroups 3.11
- Choice of Lotus Windows application

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**Pentium-90 \$4095**

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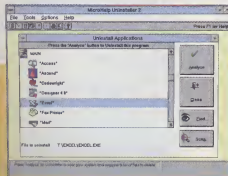
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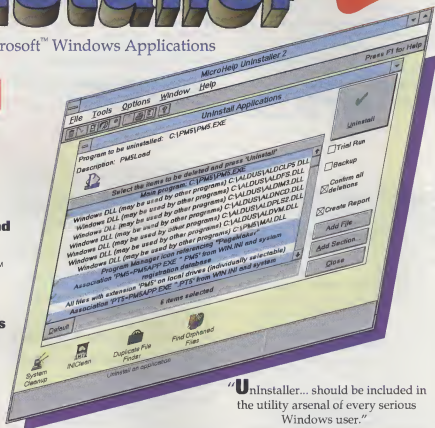


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"WINDOWS MAGAZINE," April 1993



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## DOS Devotees Delve Into Discussion

*The GUI art conundrum, more Somerson/Dvorak hoopla, and the usual Jillette jingoism.*

### A DOS Is a DOS Is a DOS

Ron White's article, "Will the Best DOS Please Stand Up" (February, page 183), was excellent and unbiased—a refreshing break in these days of ad-hype overload. DOS is more than just an invisible operating system: The added features are really important. My ideal DOS would be a marriage of IBM's PC-DOS, Novell's networking, and Quarterdeck's Desqview. Novell's DOS comes very close. If it were as automated as PC-DOS and its task-swapping capabilities were supported better, I might switch.

KEN CAVALIERE-KLUCK  
ASTORIA, NEW YORK

I'm not really in the market for a new DOS, but February's information on caching CD-ROM drives with SMARTDRV was timely and helpful. I've been trying to do this ever since MS-DOS 6.2 came out—and I even downloaded a more recent version from Microsoft's BBS. Nowhere in the documentation does it say that the line loading the CD-ROM driver must appear before the line loading SMARTDRV. So simple, yet so elusive! I was ready to plunk down \$99 for a proprietary CD-ROM cache, so as far as I'm concerned, this has paid for my subscription.

LARY HARRIS  
CARY, NORTH CAROLINA

In your DOS feature you write, "MS-DOS 6.2, for example, just plain refuses to run its new ScanDisk utility if a PC is running Stacker. So if you want to run ScanDisk, you have to uninstall Stacker." I have MS-DOS 6.2 and Stacker 3.1 installed on my system, and I decided to try the ScanDisk command. When I typed SCANDISK at the C: prompt, it told me ScanDisk cannot be used to

correct disk problems while Stacker is running and that ScanDisk will identify, but not correct, problems. I then clicked on OK and ScanDisk executed on the system. Certainly, all the power of ScanDisk is not utilized. However, ScanDisk did run on my system.

E.J. HARRISON  
WILLIAMSTON, NORTH CAROLINA

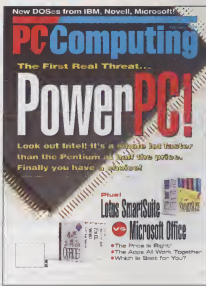
In the beta release, ScanDisk did not function at all if it detected the presence of Stacker. This was changed for the

recent feature story about business software suites ("Suite Sensations," February, page 158). Your article compared two of the same suites that were discussed in PC Magazine. If one of the articles had been delayed by even a few months, there probably would have been some additional information available and the later article would have been more useful.

GERALD EXSTEIN  
LUTZ, FLORIDA

Since many PC/Computing readers don't read PC Magazine—and we don't consult with PC Magazine editors about the timing of articles—we'll continue to provide readers with timely access to product information. When there is new and additional information to report on these products, rest assured we will cover it.

—Editors



final release, so that ScanDisk detects, but does not actually alter, Stacker.

—Ron White

### How Suite It Isn't

I enjoy subscriptions to both PC/Computing and PC Magazine because they are written from different perspectives. I was disappointed, however, with your

### Eating Ink Cartridges Alive

Regarding your testing of printers, most recently Epson America's Stylus 300 and Hewlett-Packard's DeskJet 310 in your February issue ("Best Printer Deals Yet! New Ink Jets from Epson and HP," New! page 56), I think you're overlooking one very important factor: The cost of expendables such as ink cartridges can be substantial and should be factored into the cost of the printer. I own a Canon BJ-200 that just eats ink cartridges alive, at \$23 to \$25 each.

CHARLES WHITLATCH  
DULUTH, GEORGIA

The cost of printer materials is, indeed, an important influence on a purchasing decision. But since document volume and type vary so greatly among users, we factor ink cartridge price when calculating cost per page.

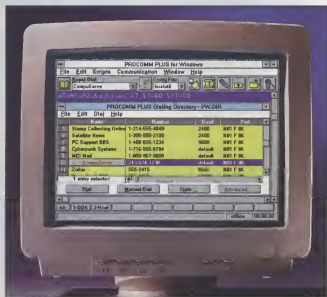
—Editors



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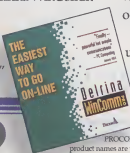
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## Sounding Off

After reading Christine Grech's article, "Great Sound Today—Easy Upgrades Tomorrow" (January, page 38), I bought the Diamond Computer Systems' SonicSound audio card. The caption states, "By the time you read this, a free 3-D stereo QSound upgrade will be available. The upgrade will involve either a quick download from Diamond's BBS and a short software installation—or it will already be bundled with the board." As of this writing, it was still not available.

Also, you write, "The SonicSound's upgrade options are already legion..." Pardon me, but there isn't even a driver for this card to run in OS/2, even though they promised this to me when the card was ordered. Is this the same card about which you wrote, "Your best bet is the SonicSound... a board that will keep pace with you for years." If so, I'd better slow down a little so the card can keep up!

MARK WALTERS  
OLATHE, KANSAS

*The SonicSound card that we reviewed did indeed have the QSound upgrade, and we were assured that it would be available free to readers by the time our review ran. Diamond Computer Systems, however, ran into some delays in finalizing their licensing agreement with QSound and the upgrade was held up. It's now available, but Diamond is charging \$129 for the extra ROM required to support it. SonicSound owners interested in the upgrade should call (408) 736-2000. —Editors*

## Only Trying to Help

PC/Computing has helped me more than any book I've ever read. However, in February's Help section ("Rev Up Windows with a RAM Drive," page 206), Brian Livingston suggested running Windows from a 10MB RAM drive. What a bad idea. If you load Windows and its system directory, you use the entire 10MB. Most people use

Windows as an operating system to run other apps. With the entire 10MB used up, there's no room for the apps, so you'll still be doing big-time disk reads. Also, most Windows directories and all the subdirectories are well over the 10MB limit, with system directory pulling up the rear.

MICHAEL BRYANT  
ANGIE, LOUISIANA

## Identity Crisis

You are a computing magazine, not a Windows magazine. While Windows is one of the most impressive improvements revolutionizing the computer industry, you should maintain an unbiased attitude toward all aspects of the computing business.

JOHN FLORESCO  
KITCHENER, CANADA

## Where's the Index?

So you guys tout yourselves as the pundits of usability, yet you neglect to

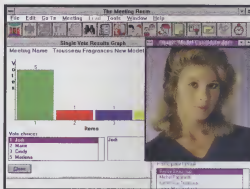
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—PC WEEK, January 17, 1994





# Letters

offer one of the most basic usability features of periodical publishing: an annual index of articles. Shame on you. I hope you will rectify this glaring disservice to your readers.

**TOMMY UNO**  
KAILUA, HAWAII

## Calling a Car a Car

I'm tired of the automobile business being used as an analogy to the software business. Please let me know when I can buy a car one year and upgrade to the new model the next year for less than 50 percent of its original cost. Perhaps you can also tell me where I can buy a Porsche by mail-order at a price that's 10 percent less than retail, and save on tax, too? Heck, I'll settle on a Porsche-compatible, same number of seats, same engine, same size, at half the price IBM sells their Porsche. Who cares if it's made in Taiwan!

**STAN COPLAN**  
PHILADELPHIA, PENNSYLVANIA

## Big Taillfins Optional

I'm quite tired of reviewers and editors constantly demeaning the caddy-based CD-ROM drives.

I've used both caddy-based and caddy-less drives, and the caddy-based system is superior for two reasons. First, it's safer, protecting CDs from dust and repeated handling. Second, I can keep all my disks in individual caddies. What could be simpler?

**MICHAEL HOWLE**  
FLORENCE, SOUTH CAROLINA

## Patently Offensive

Seldom have I witnessed John C. Dvorak and Paul Somerson both so far off base ("Will Prudes and Patents Stop the Multimedia Juggernaut?" February, page 108). Somerson thinks that the concern about all of the sex and violence in multimedia and games is completely ridiculous. Dvorak, meanwhile, has stated that an algorithm can't be patented because a random

combination of steps could conceivably duplicate the algorithm.

Patents protect ideas. If the idea is embodied in an algorithm, does that make the idea unpatentable? Not if patent protection is generally applicable. An algorithm is an idea, and the program that implements an algorithm is an expression of that idea. Thus, the algorithm should be patented, just as the program should be copyrighted. Algorithms should not be second-class citizens in the world of intellectual property.

**MIKE STIMPSON**  
SALT LAKE CITY, UTAH

Your otherwise excellent magazine continues to be marred by the Dvorak/Somerson point-counterpoint, especially their attempt in the February issue to pass themselves off as intellectual-property attorneys.

Somerson made an absurd leap of logic by averring that any attempt to

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## Letters

limit the sickening violence in CD-ROMs is tantamount to noses sanitizing newsweeklies.

MICHAEL DOUGHERTY  
HIGH VIEW, WEST VIRGINIA

Somerson's assertions that violent computer games have no effect on people exposed to them is ignorant. Of course CD-ROMs alone don't create society's ills; but they're part of a larger problem that Somerson appears oblivious to. I wish Dvorak had taken issue with Somerson.

JEROME P. RUBIN  
MILLIS, MASSACHUSETTS

*Hey guys, thanks for setting me straight. It's those pesky CD-ROMs that have made the world such a violent place. It's merely a coincidence that humans have slaughtered each other for millennia in the name of nationalism, religion, or greed. You big thinkers are right—let's fix everything by censoring those darned disks.*  
—Paul Somerson

### Stained Glass Windows?

As a small-time artist/craftsman, and sometime critic and judge, I completely agree with Ed Bott's column ("I May Not Know C++, but I Know Great Art When I See It," February, page 20).

Obscure nerds creating great computer programs are better artists than the mud-pile makers that churn out offal for our contemporary galleries. These people take a broken chair and some wire, a few tin cans, and a couple of old turn photographs, and call it art. They haven't got the faintest idea what goes into making art. But the best computer programmers do know and they deserve appreciation.

ANSELME ATKINS  
DECATUR, GEORGIA

Well, I know great art when I see it too, Ed, and the Mac is where it's at. True, the word Macintosh is generally considered a dirty word by those of us who like to wrestle with PCs, but let's give credit where credit is due. Nothing on our side of the fence can match the sleek, flowing shape of the new Macs or the cool split keyboard Apple offers. Why aren't PCs this beautiful? Of course, there's also the nice GUI software they have, but I won't

get into that, lest I get depressed and turn in my PC for a Quadra.

JOHN S. PERKINS  
FORT DODGE, IOWA

### Leash the Hypocrite

Doesn't anybody edit Penn Jillette's column? He used his entire monthly editorial space ("Shhh! Be Vewy Quiet—I'm Hunting Luddites," March, page 340) to spew venom at fellow columnist Ellen Goodman, whom he accused of writing a syndicated column on no particular subject. What the hell is going on here? The whole magazine is starting to smell like Penn Jillette! Put a leash on this guy.

JIM PERRY  
SCHWENKSVILLE, PENNSYLVANIA

Who is Penn Jillette and why is he so angry? I haven't read such a venomous hissy fit since Truman Capote called Jesse Helms a "flaming liberal." Based on his skewering of Ellen Goodman, she must have left him as cyberspace roadkill on the Information Superhighway.

P.S. WARREN  
WAYNESBORO, VIRGINIA

I love *PC/Computing*, and I think Jillette produces a great back page. Every month, the first thing I read are the letters to the editor to see who's bashing Jillette and why they're bashing him. Next, I read the back page to see who Jillette's bashing and why.

JIM DEIGHAN  
CHARLOTTETOWN, CANADA

### Correction

We incorrectly listed the date and location of the upcoming DSPX Exposition and Symposium on page 200 of our March feature, "DSP: The Secret Is Out!" The event will take place from June 13 to 15 in San Francisco. For more information call Reed Exhibition Companies at (203) 964-8287.

*Mail your thoughts to Letters, PC/Computing, 950 Tower Lane, 19th Floor, Foster City, CA 94404; fax us at (415) 578-7029; or contact us via MCI Mail at PCC Editorial or via PC/Contact, our online forum. Letters must be signed and must include a daytime phone number. All letters become the property of PC/Computing and will be edited for length and clarity.* ■

## Okidata Stands Out



November 23, 1993  
Okidata OL400e

If you don't believe Okidata 400e-Series printers can make you stand out, read some of the reviews we've been getting.

OL400e "...if you want laser quality, you won't find a better bargain." "During testing, it beat many of the more expensive models with 4-ppm engines."

—PC Magazine, 11/23/93

"...OL400e is breaking new ground..."  
—U.S. News & World Report, 9/13/93

"...Small, Fast, and Inexpensive. Offers better performance and one of the lowest prices around. OL400e printed a sample newsletter in about a third less time (than the LaserJet® 4L)."

—PC World, 11/93

"...Laser output at unlaserlike price." "Okidata's OL400e...may remove the last obstacle for true laser quality to permeate the budget-minded small business."

—Byte, 9/93

OL400e "...the bargain of the year."  
—PC Week, 12/20/93

OL410e "The affordable choice for users requiring 600 dpi resolution."  
—HFD, 11/15/93

Circle 119 on reader service card.

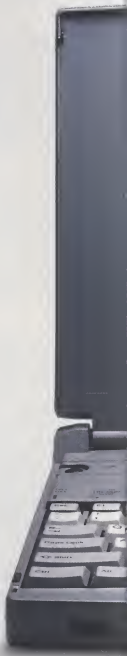
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## OKIDATA



# Remember when color TVs suddenly became affordable? Can you say déjà vu?

Unless you still watch a black and white TV and listen to 8-track tapes, price is probably the only thing stopping you from getting a color notebook. In which case, we'd like to introduce you to the Bravo NB. Not just because it's affordable, but also because it has features you normally don't find on notebooks costing hundreds more. Like the most advanced Dual Scan STN technology, which gives you 256 bright, clear colors on a full-size 9.5" screen. To make sure you won't have to wait to see those colors, it has a powerful Intel 33MHz 486SX microprocessor, local bus video and 512KB video memory. It also has 4MB RAM that can be expanded to 20MB and a 200MB hard drive. There's even a Type III PCMCIA expansion slot so you can send or access information from anywhere, as well as enough other features to fill that column to your right. And since our resellers perform as well as our computers, you can get one right away by calling 800-876-4AST. All of which should make choosing a color notebook as simple as, well, black and white.



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Dual Scan STN color now with a 486SX/33 processor for under \$2,400\*.



# New!

TI AND TOSHIBA UNLEASH STRONGER, FASTER PORTABLES

## The First 75MHz DX4

**NEW SPEED CHAMPS**  
Who's the fastest portable in the West (or anywhere else)? Texas Instruments' TravelMate 4000E WinDX4/75, followed closely by Toshiba's T4800CT.

The extra horsepower of Intel's new 486 DX4 really shows onscreen. Windows zips, spreadsheets crunch, and even big, colorful desktop presentations run smoothly. You're on your Windows desktop in 30 seconds.

Battery life? Well, the DX4 draws more juice. Toshiba has compensated for it; Texas Instruments hasn't. We ran down both batteries with everything going full tilt and got an adequate 2½ hours from the T4800CT, but only 1½ hours from the TravelMate 4000E.

Both machines will do much better if you take advantage of their power-conservation methods.

**S**PEED IS GOOD. Speed in a small, lithe package is better. If you agree, you'll find the new 75MHz DX4-based portables from Texas Instruments and Toshiba America Information Systems to be, quite simply, the best portables you can buy.

Intel's DX4 takes the system's clock signal and multiplies it to run the CPU faster than the rest of the system. The portable 75MHz DX4 runs on 25MHz motherboards; the desktop DX4s will be 100MHz chips running on 33MHz or 50MHz system boards.

The first DX4 machine we received, Toshiba's T4800CT, is an all-around knockout with active-matrix color, a lot of RAM, a big hard drive, PCMCIA slots, built-in sound—the works. TI's TravelMate 4000E WinDX4/75 Active Matrix Color system matches it in raw horsepower, screen quality, and performance, but it lacks a few of the extras found on Toshiba's T4800CT.

Both machines are variations on earlier DX2/50 Toshiba and TI models. The 3.6-pound TravelMate 4000E mixes its



TI's TravelMate 4000E WinDX4/75 (right) gives you a good price and sizzling performance. Toshiba's more fully featured T4800CT (left) isn't as fast, but it's faster than any DX2/50 out there and has better battery life.

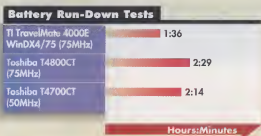
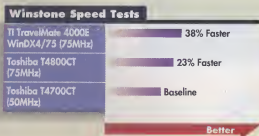
new 3.3-volt 486 processor with 5-volt components. By contrast, the 6.9-pound T4800CT inherited a full 3.3-volt motherboard from the T4700CT.

### How Much Faster?

These systems run 25 to 35 percent faster than their 50MHz DX2 siblings (see "New Speed Champs," at left). On top of that, both have fast, 32-bit local-bus video subsystems and vibrant active-matrix

PC/COMPUTING LAB REPORT:

**AWESOME SPEED—AND DECENT BATTERY LIFE, TOO**



Note: Winstone is a system-level benchmark that runs 12 of the most popular Windows business applications and delivers a single score based on their combined performance.



# Notebooks!

screens. The T4800CT has a 9.5-inch diagonal, single-light LCD driven by Western Digital's new RocketChip WD24 VESA controller with 1MB of 80ns video memory for 256 colors at 640-by-480-pixel resolution. The TravelMate 4000E coaxes the same number of colors at the same resolutions from the Cirrus Logic 6440, a 32-bit local-bus adapter with 1MB of more expensive and faster 60ns video RAM.

## Power Eaters Anonymous

Although it's a 3.3-volt chip, the DX4 draws more power than its 5-volt DX2 cousins. So do the large screens and hard drives found on the T4800CT and TravelMate 4000E.

Both portables constantly measure and manage power—even shutting down the DX4 between keystrokes. But Toshiba's T4800CT has a higher-wattage, nickel-metal hydride battery and 3.3-volt motherboard that help it run considerably longer than the TravelMate 4000E, which has the same nickel-cadmium battery found on earlier models.

Like previous TI TravelMates, the TravelMate 4000E has an incomparable 4mm-travel keyboard that feels better than a desktop one. The T4800CT keyboard is top-notch as well, but offers 3mm key travel, yielding a firmer feel.

The most glaring imperfection in both these machines is their lack of a built-in pointing device—both have the Microsoft QuickPort hotshoe for attaching an included external trackball.

## Which to Buy?

If speed is your need, the TravelMate 4000E coaxes better Windows performance from its faster 5-volt components, and it's lighter than a similarly configured T4800CT. But like its

predecessor, the TravelMate 4000E lacks a PCMCIA slot—an unacceptable handicap. The T4800CT, on the other hand, includes both a PCMCIA Type II slot and a Type III slot for memory, peripherals, and a hard drive. It's also multimedia-ready with built-in 16-bit sound and both external microphone and speaker jacks. Its 3.3-volt architecture delivers much better battery life than the TravelMate 4000E. Finally, you should be able to find the T4800CT for about the same price as a comparably configured TravelMate 4000E. **MIKE HOGAN**

**T4800CT** • \$5,549 (ESTIMATED STREET PRICE WITH 8MB OF RAM, 500MB HARD DRIVE, AND 9.5-INCH LCD) • TOSHIBA AMERICA INFORMATION SYSTEMS • (800) 334-3445, (714) 583-5000  
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


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## GUIDE TO CHIPS

Ironically, the first systems with Intel's new DX4 processor came from two portable vendors, Texas Instruments and Toshiba America Information Systems, rather than from desktop vendors who face less of a design challenge.

The 25MHz/75MHz portable version of the DX4 processor runs internally at 75MHz, giving it a lower iComp performance rating than the 100MHz desktop DX4 chip.

Historically, there has been at least a \$1,000 price premium for portables over similarly configured desktop systems—even more in the early stages of product availability.

	i486 DX2	DX4	Pentium
<b>CPU speed</b>	50MHz, 66MHz	75MHz, 100MHz	60MHz, 66MHz, 90MHz, 100MHz
<b>iComp rating</b>	50MHz: 231 66MHz: 297	75MHz: 319 100MHz: 435	60MHz: 510 66MHz: 567 90MHz: 735 100MHz: 815
<b>Internal cache</b>	8K	16K	Two 8K caches
<b>Typical system prices</b>	50 MHz portable: \$3,500 66MHz desktop: \$1,500	75MHz portable: \$5,000 100MHz desktop: \$2,000	60MHz desktop: \$2,500 66MHz desktop: \$3,000 90MHz desktop: \$3,500 100MHz desktop: \$4,000
			

Note: The iComp rating is Intel's performance-oriented system comparison score.



## BLACK-AND-WHITE ULTRALIGHTS—MANO A MANO

## Compaq Contura



#### SCREAMIN' MINIS

Performance from Compaq's new Contura Aero (above) is good, but it's no match for Toshiba's Portégé T3400. A faster processor only partly explains its edge. Its performance in screen-intensive chores—such as in Corel Draw and text scrolls—soared, thanks to local-bus video and a 32-bit graphics accelerator.

The battery hit for such screaming speed? Nil. This is because the Portégé uses lithium-ion batteries, which deliver up to 30 percent more life per pound. The Aero's battery life can be extended with an optional heavy-duty battery, but this adds weight and cost.

**T**OUCH ME. THIS is what Compaq Computer's new Contura Aero seems to say as you pick it up. Hands move irresistibly to the keyboard, where you find the same soft-but-reassuring click that made the full-sized Contura's keyboard so successful.

Or maybe the Contura Aero is saying *carry me*, which is something your 6-pound notebook with its bulky AC adapter hasn't said in a long time. At 3.5 pounds, Compaq's first subnotebook arrives fast on the heels of Toshiba's 4.1-pound Portégé T3400. Both machines come in monochrome or color models (the color Contura Aero wasn't available at press time). If price were no object, we'd spring for the color versions of these computers. But if what you want is a small, lightweight machine for word processing and similar tasks, you'll find either of these mono ultralights to be a great value. Both provide full 486 power, meticulously minimized keyboards, and bright—if oh-so-small—displays.

#### Look at Me

The Contura Aero we tested is Compaq's teaser machine. Most monochrome subnotes cost about \$2,000 and weigh about four pounds. The Contura Aero is a half-pound lighter and about \$500 cheaper. In its sub-\$1,500 configuration, the Contura Aero is equipped with Intel's 25MHz 486SX CPU, 4MB of RAM (expandable to 12MB), and

an 84MB hard drive (with a 170MB option).

Ah, but both the weight and price of the Contura Aero can be deceiving. For example, the standard nickel-metal hydride battery on the monochrome Contura Aero is smaller than the battery that comes on color models. The monochrome's battery delivered only about two hours of continuous operation.

You can buy the larger battery for your monochrome Contura Aero—as a \$99 option—but it bumps up the subnote's weight by a full pound. In comparison, the more expensive Portégé will run for more than 4 hours on its standard battery, even though it has a slightly larger display—8.4 inches compared to the Contura Aero's 8 inches.

#### High Tech, High Price

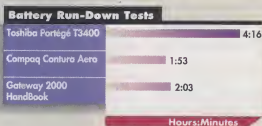
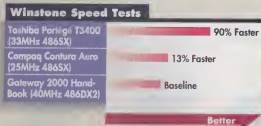
Larger display, longer battery life—how does Toshiba do it? The Portégé is the first portable to use lithium-ion batteries, which deliver 30 percent longer life per pound than comparable nickel-metal hydride batteries. This innovation is expensive. At street prices, the monochrome Portégé runs about \$600 more than the mono Contura Aero.

Toshiba wants the Portégé to become the high-end standard for today's mobile executive. By contrast, the Contura Aero is a machine for budget-conscious communicators, memo writers, and spreadsheet crunchers who simply need a serious road tool.

The Portégé uses Intel's faster, 33MHz 486SX CPU and comes with a larger 120MB hard drive. Memory is expandable to 20MB

#### PC/COMPUTING LAB REPORT:

#### TOSHIBA IS FASTER, LASTS LONGER—BUT IT'LL COST YOU



Note: Winstone is a system-level benchmark that runs 12 of the most popular Windows business applications and delivers a single score based on their combined performance.



# Aero vs. Toshiba Portégé

(SMB more than the Contura Aero). The Contura Aero is no slouch, but the Portégé is much faster (see "Screamin' Minis," at left).

The Contura Aero doesn't win the technology battle, but it is an outstanding value. And differences between the Contura Aero and the Portégé begin to recede when fingers meet keys. Both companies paid fanatical attention to their keyboards, recognizing that usability is more important than screen response times or processor speeds when maximizing productivity. The results are impressive.

We like the Contura Aero's cursor controls more than the Portégé's. We also like the Contura Aero's Ctrl and Alt keys, which line up to the left of the space bar. On the other hand, the Portégé offers independent Page Up, Page Down, Home, and End keys, while the Contura Aero does not.

Touch typists—even with pudgy fingers—can work either machine's keyboard, thanks to key spacing that's about 90 percent of the size of the spacing in a standard keyboard. Like the Portégé, the Contura Aero's key response is soft and quiet, while providing enough tactile feedback to urge fingers quickly to the next keys. Both also have more than two inches of wrist rest below the space bar, making typing more comfy. (Psst, Compaq: Leglets that prop the machine up in back ease wrist pressure immensely.)

## Trackball Face-Off

Toshiba licensed IBM's clever TrackPoint II pointing device—they call it the AccuPoint—and embedded it in between the G, H, and B keys. The mouse buttons rest below the spacebar. Not everybody loves this arrangement, but we think it's

one of the best pointing devices we've found on any portable.

The Contura Aero, on the other hand, uses a marble-sized trackball that's popular on many subnotes. It's situated in the lower right corner as if it were a flipper button on a pinball machine (sorry, southpaws), with side-mounted mouse buttons. You must move your right hand from its typing

position to use the trackball.

But what's this, the external floppy drive costs \$179 extra? (The drive is included with the Portégé.) Expandability isn't all bad news, however: The PCMCIA Type II slot is compatible with a lot of peripherals, including Compaq's own excellent high-speed fax modem.

The color Contura Aero, which should hit the streets before you read this, is expected to cost less than \$2,200—at least \$1,100 less than a comparable Portégé. To keep the costs down, Compaq plans to use a single-scan, passive-matrix design that's based on the company's own chip set.

Is the Portégé worth a \$600 premium? If your subnote will be your main machine, we think so. It's a got a better screen, longer battery life, and a superior pointing device.

Yet, despite a few shameless hidden costs and a pea-sized trackball that we'd be happy to lose, the Contura Aero delivers excellent value for the dollar. Power management and system configuration routines are also Compaq's forte. And we like the Contura Aero's unpretentious good looks. **MARTY JEROME**

**CONTURA AERO** • \$1,399 FOR MONOCHROME (ESTIMATED STREET PRICE), \$2,199 FOR COLOR (ESTIMATED STREET PRICE) • COMPAQ COMPUTER CORP. • (713) 374-1370  
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## ▲ SNAP-ON TOOLS

When the memo comes down that management will support only one PC per employee, will you settle for a subnotebook?

Gulp. The power is there, but can you really work on that tiny screen day in and day out? No need to: Compaq and Toshiba both have trim port replicators. They allow you to connect an external keyboard, monitor, printer, modem, and mouse with a single snap-on attachment.

Toshiba's S239 port replicator (above) provides VGA, parallel, serial, mouse, and keyboard connectors to the Portégé (below). Compaq's S99 Convenience Base comes with a battery charger, and supports an external monitor, keyboard, and mouse.





## WordPerfect Telephone Access Server: E-Mail That Talks Back

### CALLING CARD

Dialogic supplies the phone hardware—the DV41D call-processing board—for WordPerfect's Office Telephone Access Server (TAS). The board acts as a bridge between the analog phone line and the TAS software, answering incoming calls and recognizing the touch-tone signals entered by the user. It supports up to four incoming lines, and the Phone Access Server software (below) displays the status and usage of each line. When you create a new message or calendar item using TAS, it's the Dialogic board that digitizes, compresses, and stores it on the server's hard disk. Likewise, it decompresses and plays the sound files created by TAS's text-to-speech conversion program over the phone line.

Although WordPerfect is

### WORKAHOLICS REJOICE!

Now you don't have to lug your laptop around from airport to boardroom to hotel just to stay current with your e-mail and appointments. WordPerfect's new Office Telephone Access Server (TAS) lets you dial in for your messages, listen to calendar entries and to-do lists, and create new appointments, using any touch-tone telephone.

The server runs in conjunction with the WordPerfect Office Message Server under OS/2 2.1, and it requires at least one Dialogic phone board in the system (see "Calling Card," at left). Installation isn't trivial, but the setup is a one-time administrator function. For end users, this is truly a simple product to use.

### Push-Button Access

Once the server is configured, you dial in and enter your ID number and password using the numerical keypad on any touch-tone phone. Like any plain-vanilla voice-mail system, TAS lets you know if you have any new messages and gives you several message-handling options.

Unlike traditional voice mail, however, TAS can actually read your e-mail to you. It also reads your calendar (there's a handy "next appointment" shortcut that instantly reads you your next meeting), and it lets you enter new tasks or even delegate responsibilities. TAS will also search your messages, appointments, and to-do lists for specific text strings, then read you the results.

You can even have the system send your e-mail or calendar to a nearby fax machine. In short, anything you can do with Office from a PC, you can do by navigating through TAS menus.

TAS accomplishes all of this using a text-to-speech conversion algorithm. Although the system is relatively sophisticated in that it can recognize



With the WordPerfect Telephone Access Server, you can listen to and search your e-mail and schedule items, and create and send new audio messages (indicated by the musical notes) to another user's mailbox.

unusual words, the computer-generated voice on our review unit sounded like 2001's HAL 9000 with a head cold. WordPerfect is planning to use a female voice—that supposedly cuts through background noise better—in the final product.

The real sticking point with TAS is that the interface—the telephone keypad—is severely limited. Sure, if you have the patience and brain power to remember long sequences of menu selections, you can take advantage of sophisticated message search and tracking features. But TAS is most useful for listening to your e-mail subject lines and upcoming calendar appointments.

### Press 1 for E-Mail

One final feature worth mentioning: You can create audio mail messages using TAS, which will show up in the recipient's electronic mailbox with a musical note indicator. The user can then listen to the message over the PC speaker or over the office telephone.

In our dreams of utopian technology, TAS would also translate voice-mail messages to electronic text. But we can't expect everything. TAS has a lot to offer in the way of convenience and increased productivity.

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STATISTICS				
Calls	%	In Status	User-ID	Calls
0	0	3 InUse	test1	2
0	0	4 Delook		0

the first vendor to integrate voice processing into its applications, expect to see Dialogic boards in upcoming releases from other software companies, including Lotus.

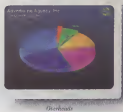




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Reports

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corporate-wide  
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## Create Dynamite Presentations With Micrografx Charisma 4.0

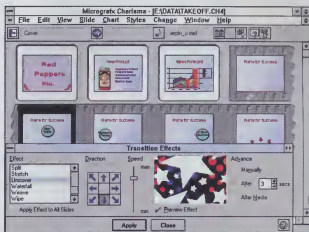
LOOKING FOR THE ultimate multimedia presentation tool? Micrografx's Charisma 4.0 is pure dynamite. Light its fuse, and you can shoot off enough fireworks to earn a standing ovation from a roomful of narcoleptics. But a little dynamite is a dangerous thing, and this 1998 *PC/Computing* MVP Award winner packs quite a punch—only after you've learned how to handle it.

### A New Face

Forget about previous presentation packages with the same name—this program is a complete rewrite. Charisma 4.0 puts a sleek, modern interface over the muscular Micrografx drawing and charting engine, then adds a superb multimedia organizer and other tools. The result is a powerful program that should appeal to Lotus Freelance Graphics users who want more sizzle in their stand-up presentations. Whether you'll make the switch, though, depends on whether you're willing to overlook some missing pieces and rough edges.

Charisma sticks with the classic model for building a presentation: You start with a master template and color scheme, add one slide at a time, rearrange the presentation on a slide sorter, and switch to outline view to give your right brain a breather. Charisma 4.0 has the now-standard usability tricks: There are helpful prompts at every turn, previews of master styles and transitions, button bars and right-button click menus galore. Best of all, there's a multiple-level undo that rolls back as many as 100 changes.

When you exit bullet-point mode, Charisma hauls out the big guns. The elegant Media Manager catalogs sound files, clip art, and full-motion video in a well-equipped control center. An integrated charting program offers 75 variations on 11 chart types. And unlike any other presentation package, its 3-D rendering



The slide sorter is a familiar metaphor, but Micrografx's Charisma 4.0 specializes in high-gloss graphics and multimedia.

engine positions the light source and adjusts intensity for any chart or symbol.

### Near Greatness

Despite flashes of brilliance, Charisma 4.0 feels like it's still one upgrade away from greatness. We encountered a few bugs, including one that corrupted our test presentation. Also, we couldn't convince the program to recognize a networked CD-ROM drive, neither during installation nor while using the Media Manager catalog.

Parts of the program look unfinished. For example, text selection in dialog boxes doesn't follow Windows' keyboard conventions. The help file is spartan, with no step-by-step instructions for complicated tasks. And the great Media Manager, with OLE 1.0 support, is accessible only from within Charisma.

If most of your presentations are simple bulleted lists, Charisma may have more firepower than you need. But for people who have outgrown Freelance Graphics or Microsoft PowerPoint, its Media Manager and slick charting tools pack enough of a wallop to justify the switch—and the longer learning curve.

ED BOTT

CHARISMA 4.0 • \$495 • MICROGRAFX • (214) 234-1769  
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### MEDIA MANAGER

How do you track the 7,000 clip-art images, 200 photos, 550 sound and music files, and 50 full-motion video clips that come with Micrografx Charisma 4.0? Use the Media Manager, a powerful control center for media files on local disks, network servers, and CD-ROM drives.

Media Manager resembles PowerPoint 4.0's ClipArt Gallery, but it does much more. Fully editable catalogs store searchable text descriptions and thumbnails of sound, video, and clip-art files (below). Clip, loop, and control the volume and balance of any sound or video file without making a disk-hogging copy of the original, then preview before applying the changes.

There's no OLE 2.0 support, and you can't use Media Manager directly with other applications. But even without these key attributes, Media Manager is Charisma's killer feature.





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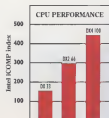
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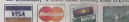
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## FileMaker Pro 2.1: A Database With the Best of Both Worlds

CLARIS FILEMAKER PRO 2.1 for Windows is a rare bird—a product that migrated from the Macintosh platform to Windows, yet melds the best features of both. It combines the ease of use of typical Mac software with a decent feature set and superb PC-based network support.

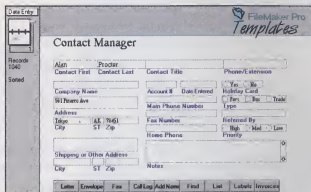
FileMaker Pro's ease of use comes at the expense of high-end features. Like Symantec's Q&A for Windows, FileMaker Pro is a flat-file database, it doesn't have Structured Query Language (SQL) or Xbase language support, nor does it offer Query-by-Example.

What it does provide is a graphic interface that lets you construct databases as easily as you would draw on a blackboard. You create a FileMaker Pro database by building a list of fields. Then, you quickly format layouts—which can be used for anything from data entry to printing mailing labels—using a good selection of drawing tools. The number of layouts per database is limited only by disk space. You can also import and export data in a variety of popular formats.

### Basic Features

The product has its limitations, however. File size, for example, is limited to 32MB. Also, as noted earlier, FileMaker Pro lacks the more advanced querying features. However, its searching and sorting features are useful—you can use a full set of Boolean operators, and sort records alphabetically or numerically, in ascending or descending order, using an unlimited number of fields.

FileMaker Pro's ScriptMaker makes complex script creation a simple point-and-click operation. The scripts can be triggered from a user-defined button in a layout or from the drop-down menu of scripts. FileMaker Pro scripts can also support pauses for input and



Claris' FileMaker Pro 2.1 for Windows includes a set of graphical tools and predefined templates that make it easy to build a database, although it lacks more advanced querying tools.

subscripts placed within scripts.

Good as it is, FileMaker Pro's transition to Windows is not quite complete. DDE is available only as an Execute function within scripts, allowing a script to send a command to another application to execute a series of operations. OLE is not supported, but will be included in the next major release.

### Not Fast, but Easy

FileMaker Pro 2.1 for Windows is a useful flat-file database application, especially for those who need only the basics. This is not a power-user's tool, given the 32MB file size restriction and its limited querying tools.

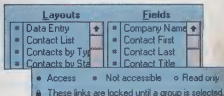
It also sports some odd interface metaphors that are not exactly intuitive; for example, using a Rolodex icon instead of arrows to navigate through records in a database. Nor is it extraordinarily fast: Complex sorts on a large database can take a fair amount of time. However, this is more than made up for by its ease of use and versatility. In FileMaker Pro, Claris has brought the best from the Macintosh world and made it available to Windows users.

DENNIS FOWLER

### MULTICULTURAL

The latest version of FileMaker Pro is more than a Mac product revamped for Windows—it also allows you to share data between the two platforms. While Version 2.0 of FileMaker Pro for Windows allowed full sharing of data files across a variety of AppleTalk-compliant networks, Version 2.1 goes even further. Macintosh and Windows databases are binary compatible; they can be read from either platform, regardless of the creator's origin.

Version 2.1 also adds NetBIOS and Novell NetWare support, allowing file sharing



between Macs and PCs over Windows-compatible NetBIOS networks; up to 25 Mac or Windows users can access a FileMaker Pro database simultaneously. Naturally, a range of security functions (see screen above) is available on a group or individual user basis, with full password protection.

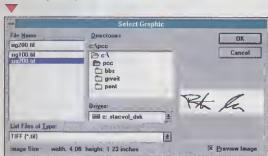
FILEMAKER PRO 2.1 FOR WINDOWS • \$129 THROUGH JUNE, \$399 THEREAFTER, \$99 COMPETITIVE UPGRADE • CLARIS CORP. • (800) 735-7393, (408) 987-7000 Circle No. 607 on Reader Service Card



## Reach Out and Fax Someone With Delrina's WinFax Pro 4.0

### STAMP OF APPROVAL

One of the slicker features of WinFax Pro 4.0 is the way it lets you create "stamps" of graphics you commonly place on faxes. For example, to add your signature to a fax, you create a stamp of your John Hancock, then just paste it into a fax file (below).



Creating a new stamp is easy: Click on the Stamp icon in the annotation toolbar, which is in the WinFax viewer. Select New, and a New Stamp dialog box pops up, which guides you through the process.

If THE NEWEST version of Delrina WinFax Pro doesn't get you to use your fax modem, then *nothing* will. Version 4.0 of the best-selling Windows fax software sports a streamlined interface, and stresses usability, performance, and a host of new features for both mobile computer users and those who use electronic mail on their networks.

Overall, the program is sleeker and more customizable. For example, you can now create folders to file documents. We also liked its new drag-and-drop capabilities: To forward a fax to someone, for example, just drag the fax icon from the fax log to the Send button to shoot it off to

another networked user. WinFax Pro has also made it much easier to send attachments along with your fax. Instead of having to go through a complicated gathering-and-conversion process, you browse through your hard disk and click on files you want enclosed.

### Beyond Faxing

The program's markup capabilities have been improved, most noticeably with its "stamp" feature (see "Stamp of Approval," at left). Also, WinFax Pro now allows you to send data files to other fax modems, so that the recipient can have the actual files—a Microsoft Word for Windows document, for example—instead of a bit-mapped image of the files.

WinFax Pro includes e-mail support for cc:Mail and Microsoft Mail so that you can now use it to manage not just your faxes, but also e-mail to network users. For example, if you have a word processing

document you want sent to a number of people, some of whom have fax modems, some of whom have fax machines, and some of whom are available on the network by e-mail, you can send that single fax to multiple recipients, and those with fax machines will get the faxed document, those with compatible fax modems will get it as a binary file, and those on e-mail will get it as an attachment to a message. To make this new feature accessible, the program's interface has been touched up, and it now has customizable toolbars. The graphics viewer is faster now as well.

### On the Road Again

If you travel, WinFax Pro has a host of new services and features for you, including built-in support for Delrina's Fax MailBox service, a toll-free number for people who need to send you faxes. It's like voice mail, but it stores faxes: When you connect your computer to the service, it downloads your faxes to you. Another way to have faxes follow you is to use the new AutoForwarding feature that forwards faxes from one PC (say, the one at your desk) to another (the one in your hotel room, for example).

In short, the best fax software just got a whole lot better. Anyone with a fax modem should check out this program.

PRESTON GRALLA

WINFAX PRO 4.0 • \$129 • DELRINA CORP. •  
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The newest version of Delrina's WinFax Pro, Version 4.0, adds fax folders and drag-and-drop forwarding, and it supports binary file transfer.



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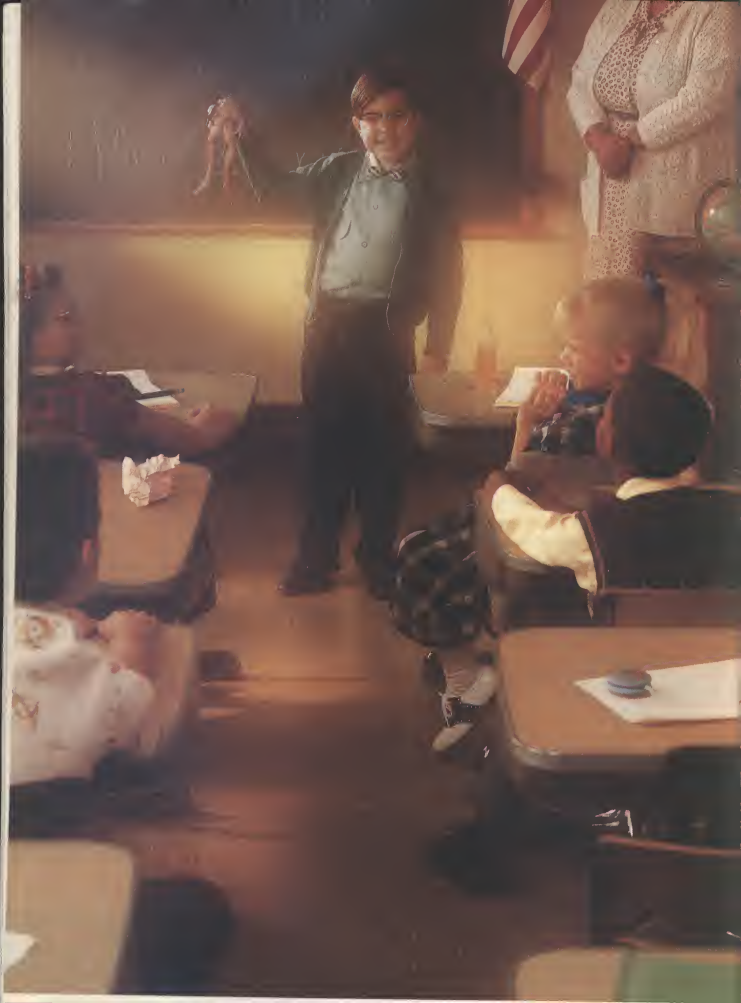


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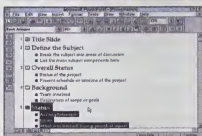
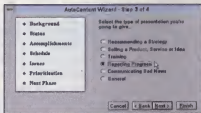
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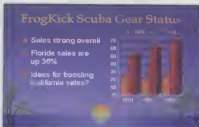
Using an innovative feature called AutoContent Wizard, pick a



*With AutoContent Wizard, first select a presentation type, then simply enter your content in the outline provided.*

presentation type. Then, the Wizard helps you quickly turn your ideas into a fully formatted presentation.

It's all part of IntelliSense™ technology, built-in intelligence that makes routine tasks automatic and complex tasks easier: a unique feature of the Microsoft Office family.



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The fact is, PowerPoint 4.0 is so easy to use, you may already know how. Why? Over 100 PowerPoint tasks are done exactly the same way in Microsoft Excel and Word. And now with OfficeLinks, turn a Word 6.0 document into a presentation in PowerPoint with a click.

All told, new PowerPoint 4.0 makes it easy to give more effective presentations. So you'll once again master the art of show-and-tell. Visit a reseller or to find one near you call (800) 695-2850, Dept. KZ8.



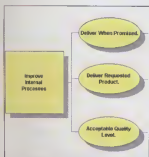
## Microsoft Office



## FlowCharter and allClear: Almost Worth a Thousand Words

### QUALITY CONTROL

Your business just isn't cool if it doesn't have a Total Quality Management (TQM) program. You can use either ABC FlowCharter 3.0 or allClear to illustrate your company's quality-control process. FlowCharter includes a vertical toolbar with basic tools for point-and-click diagram construction (see screen at right), as well as standard ISO-compliant shapes for TQM charting. AllClear, by contrast, includes basic geometric shapes and builds the diagram only after you've keyed in your script (below). Once that's done, however, you can edit the script and view the diagram simultaneously.



Script - c:\all2\chsample.tad  
Total Quality Management  
Improve | Internal | Processes  
Acceptable Quality Level.  
Correctly pack products.  
Update and reprint information.  
Deliver Requested Product.  
Ship correct order.

YOUR MISSION: CREATE a diagram of your company's production process. Due date: yesterday. Your arsenal: Micrografx's ABC FlowCharter 3.0 and Clear Software's allClear for Windows. End result: mission accomplished, but only if you choose your weapon wisely.

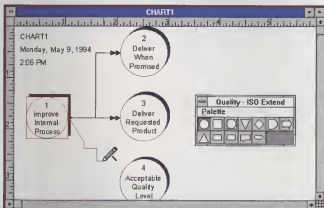
Both FlowCharter and allClear create organizational charts, flowcharts, decision trees, and diagrams. The end results may look the same, but the two products are fundamentally different. FlowCharter's approach is purely graphical: Using familiar drawing tools and color palettes, you build diagrams by clicking and dragging. To make a chart with allClear, you have to write a highly structured script that is then converted into a flowchart (see "Quality Control," at left).

### Tales from the Script

AllClear's script files, built using the allClear Editor, are written descriptions of what you want to illustrate. Punctuation marks and tabs within the script denote the specific relationships and functions your diagram will depict. For example, a question mark denotes an if/then decision, a backslash signifies the beginning of a tree, and semicolons begin and end loops. It works—once you learn all the rules—but building an allClear script is tedious unless you're really

comfortable slinging code. And the syntax is not forgiving, although there are good diagnostic messages to help you fix text.

FlowCharter, on the other hand, is a cinch. With Version 3.0, Micrografx added shape palettes, OLE 2.0 support, and automatic alignment of graphics within



If you can visualize a chart, you can make it with ABC FlowCharter 3.0, which includes a host of useful palettes (ISO 9000 shapes shown) and line styles wrapped into a highly intuitive interface.

flowcharts. We especially liked the new instant fit-to-page feature, which is great for printing an entire diagram on a single page. FlowCharter 3.0 also lets you easily create custom shapes or import shapes from most drawing programs.

### Some Clear Advantages

If you can endure—or prefer—scripting, allClear offers numerous useful features, including a button bar that puts more than a dozen commands just a click away, from a simple Undo to a Global Style Change that lets you modify diagram type, direction, and dimensions, and it lets you choose from 24 fonts and more than 150 box shapes.

Also noteworthy are five script macros in the allClear Editor, including if/then, loop, and tree commands, which automate common script constructs. FlowCharter 3.0, on the other hand, is easy to use, fast, and, best of all, flexible. Its point-and-click interface and sharp features will have you org-charting everything from business workflow to your kid's birthday party—just for fun.

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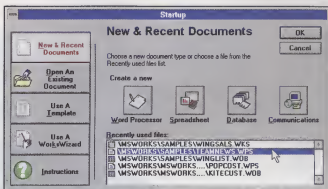
IS INTEGRATED SOFTWARE the high-tech equivalent of the cheap all-slicing, all-dicing Blend-O-Matic from late-night TV? Not anymore. Microsoft Works 3.0 for Windows' melding of word processing, spreadsheet, database, and communications modules is more like the Swiss Army knife of life software. Its bargain price—\$139—and focus on common functions make it ideal for infrequent to medium use.

But don't confuse Works with a full-fledged suite such as Microsoft's Office or Lotus's SmartSuite, which integrate several off-the-shelf industrial-strength applications. The Works applications have fewer features—but for many users, that's no loss.

In fact, Works may suit your needs better than complex products like Microsoft Word, Lotus 1-2-3, or Borland Paradox. Its trimmed-down applications share a common home screen, which makes moving data between them a simple point-and-click experience. Best of all, it does this without requiring that you sacrifice important features, lots of disk space (it requires only 15MB or less), or a great deal of time learning to use it. Works is a near-perfect compromise.

### What's New

New in this version of Works is a word processor with real-world functions such as automatic text wrap around an object, tables, multiple columns, footnotes, bulleted lists, and one-step printing to envelopes and labels. The spreadsheet now offers automatic formatting, named ranges, string functions, multiple font and color support, text wrap within a cell and across selections, one-step charting, and data protection. And the database benefits from multiple font and color support, a one-step query dialog box, multiple named queries, a Replace command, string functions, and data protection.



Switch tasks fast from Microsoft Works 3.0's Startup screen. The first toolbar button in every Works module brings you here, while the recently used files list at the bottom gets you back to where you were, pronto.

Even better is Works' new emphasis on accessibility. A dozen Wizards speed you through complex tasks such as creating form letters, home inventories, and customer profiles. The optional pop-up Cue Cards walk you through tasks. And to help you get started, check out the animated online tutorials—especially in the CD-ROM-based Multimedia Edition.

### Hot Swapping

Since Works requires less disk space than two full-sized applications, it's an ideal notebook solution. It's also good at handling files from external sources—Works can read and write files from major applications like WordPerfect 5.x, dBASE III and IV, and from Microsoft applications like Word for Windows 2.0 and 6.0 and Excel 4.0 and 5.0. But you're out of luck if you use WordPerfect 6.0 or Ami Pro, because they aren't supported directly.

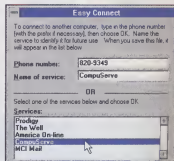
The program also supports OLE 2.0 data links and in-place editing, drag and drop within documents and between tools, undo in all tools, and pop-up button labels for Works' customizable toolbars.

This is a good program. If your business software needs are light to medium, get the right tool for the job: Works 3.0. **SCOT FINNIE**

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### WORKS GOES ONLINE

Microsoft Works 3.0 has finally dumped Windows' Terminal in favor of a whole new communications module—and there is much rejoicing. The communication tool's best feature is Easy Connect, which automates the process of setting up and connecting to online services. As long as you have a Hayes-compatible modem, you don't have to worry about data bits, stop bits, parity, or baud rates—Works figures it all out for you. And better yet, the new module even provides editable scripting for advanced online jockeys.





## The Ink Jet Challenge: Canon And HP Rise to the Occasion

### SIMPLY SPEEDY

The new printers from Hewlett-Packard and Canon are much faster than the old ink jet speed leader, the Canon BJ-200. But the Canon BJ-200e really blew the doors off the HP DeskJet 520. The BJ-200e printed our five-page Word for Windows letter more than 45 seconds faster than the HP DeskJet 520 did. A speed difference like that really adds up.

For our five-page business report that contains both text and graphics, Canon's BJ-200e finished significantly faster than its predecessor, the BJ-200. The DeskJet 520's performance was 48 seconds faster than Canon's older BJ-200, but the DeskJet logged 40 seconds behind the BJ-200e.

GO ON. We dare you. Take a page out of Hewlett-Packard's new DeskJet 520 or Canon Computer Systems' BJ-200e ink jet printer. Place it next to output from your favorite laser printer. OK, now shuffle the pages around and try to figure out which is which. Sounds easy, right? Once upon a time it was. But with these two new printers, Canon and Hewlett-Packard have brought ink jet technology to staggering new heights—at stunningly low prices. Add faster speeds to the list of enhancements, and it's really hard to go wrong with either of these gems.

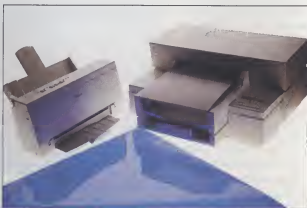
### This Year's Resolution

With the DeskJet 520, Hewlett-Packard once again sets a high standard by offering 600-by-300-dot-per-inch resolution and support

for 256 levels of gray. The DeskJet 520 turns out ultrasmooth, crisp text and stunning graphics with only a minimal amount of banding—color gradients that are stepped rather than having smooth transitions. The DeskJet 520 also includes a new quick-dry ink that prevents smearing—either by highlighting or by spilling water on a page.

There are two drawbacks to the DeskJet 520: slow printing speeds and a large footprint. It also weighs three times as much as Canon's BJ-200e. But unless you move your printers around a lot, that's incidental.

The 360-dpi resolution supported by



Business-quality output at sub-\$400 prices: You can't go wrong with Canon's BJ-200e (left) or Hewlett-Packard's DeskJet 520 (right).

Canon's BJ-200e is the same as the earlier BJ-200, but Canon has implemented a new multipass technology for its print head that provides even better print quality. Though the BJ-200e also supports 256 levels of gray, we did notice more banding in the graphics than with the DeskJet 520. Similarly, its text looks somewhat washed out in comparison to the DeskJet 520's text.

The print quality isn't as impressive as Hewlett-Packard's DeskJet 520, but it's surely nothing to sneeze at (or on, for that matter—the Canon did not hold up so well in our "accidental spill" scenarios). But Canon's BJ-200e does have some nice extras. One is its small size. And at just 6.6 pounds, you might even consider this printer portable. You also receive an impressive online guide.

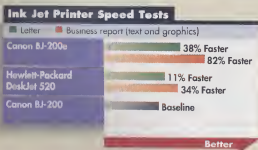
### You Won't Break the Bank

Neither of these printers will cost you an arm and a leg. But when it's time to shell out, your money will be best spent on the HP DeskJet 520. Though somewhat slower than the BJ-200e, its output quality is probably better than the 300-dpi laser sitting on your desk right now.

KYLA K. CARLSON

### PC/COMPUTING LAB REPORT:

### CANON BJ-200E FLIES THROUGH TESTS



Note: All tests were run on a 486DX/33 with 4MB of RAM using the Windows printer drivers provided with each printer.

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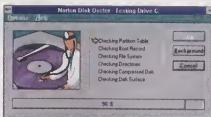
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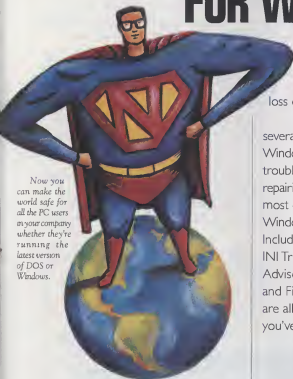


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potentially dangerous situations that could result in system failure and the

loss of your data.

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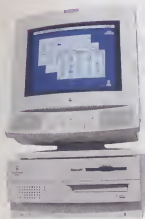


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## A New Reason to Be Jealous: Apple's Power Macintosh



▲ **It's FAST, It's SLOW**  
Apple's first PowerPC-based computers, the Power Macs, offer blazing RISC speed at amazing prices. But don't expect them to replace PCs: Native Power Mac applications such as Photoshop burn rubber (below left), but their performance running Windows apps in the SoftWindows emulator is acceptable only for occasional use (below right).

YES, THIS IS *PC/Computing*, and yes, that is a Macintosh in the photograph at the left. But it's no ordinary Mac. It's the Power Macintosh 7100, Apple's \$3,400 PowerPC-based wake-up call to Intel computer users everywhere. Along with its low-end model 6100/60 and workstation-class model 8100/80 cousins, the Power Mac 7100 has the potential to revitalize the concept of a Macintosh as a business computer.

The new Power Macs are based on the Motorola PowerPC 601 CPUs. The Power Macintosh model 6100/60, which is the lowest-priced RISC computer you can buy, runs at 60MHz. The mid-range Power Macintosh is the 7100/66, and the Power Macintosh model 8100/80 uses the king-of-the-road 80MHz PowerPC chip.

### Mac Windows?

The Power Macs have enough horsepower to emulate x86 PCs, and the optional Insignia Solutions' SoftWindows upgrades give you what you need to do so—8MB of extra RAM and a hard drive upgrade (for the 6100/60 and 8100/80). But don't expect miracles: SoftWindows only emulates a 286, and it runs Windows in Standard mode alone. And even the 80MHz Power Mac won't run Windows apps any faster than a 25MHz 486SX.

But speed is acceptable for running occasional Windows applications. For all those companies that run both PC and Mac apps, Windows performance on a Power Mac offers outstanding flexibility and savings by letting administrators place single computers on desktops that once required two.

### Should You Buy?

For Mac sites, the Power Mac is an obvious upgrade path. Nearly all of today's Macintosh applications, compiled for the 68030 and 68040 chips, run without alteration on the Power Macs. A bit of black magic called the Mixed Mode Manager lets you run both PowerPC and old 68040 code simultaneously.

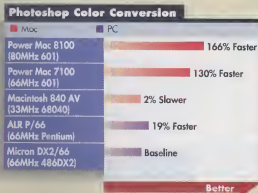
What does all this mean to us, the Intel-faithful (for now, at least)? Despite Intel's bluster, the PowerPC chip is a threat. The model 615 version of the chip that IBM is reportedly working on will include x86 emulation in hardware. That chip is a knife at the throat. Intel's most likely response: cheaper, faster Pentiums. To this we say: Thank you, Apple.

RAPHAEL NEEDLEMAN

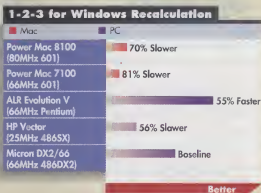
**POWER MACINTOSH 6100/60**, \$2,200, **SOFTWINDOWS UPGRADE**, \$709 • **7100/66**, \$3,379; **SOFTWINDOWS UPGRADE**, \$480 • **8100/80**, \$4,500, **SOFTWINDOWS UPGRADE**, \$1,040 • **APPLE COMPUTER** • (408) 996-1010  
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### PC/COMPUTING LAB REPORT:

#### IT'S A FAST MACINTOSH, A SLOW PC



Note: We installed native versions of Photoshop on each platform.



Note: Lotus 1-2-3 runs under SoftWindows on the Power Macs.



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## New Logitech ScanMan PowerPage Cuts the Mustard

### THREE-STEP PROGRAM

There's more than one way to call up PowerPage's Central Center software—through a hotkey shortcut, by double-



clicking on its icon, or by just slipping paper into the scanner. Once the software is running, the routine is predictable. First, it scans line by line—a process that seems sluggish to anyone who's seen Visioneer's PaperMax in action. Then the scanned image is transferred to the appropriate application. After that, the image is transferred to different software—Caere-based OCR for scanned text, FotoTouch Color for graphics, Logitech's neat print module for photocopies, or your fax



software for faxes. A handy button bar makes all the modules accessible (top).

SOMEWHERE BETWEEN a funky handheld scanner and a bulky flatbed is the perfect size for a portable scanner: a foot long—wide enough to accept a full sheet of paper, but teeny in all other dimensions. That's why they're called *hot dog scanners*. The most notable are Nisca's

groundbreaking Niscan Page (see "Niscan Page: OCR, Grayscale Scans, and Fax Input—To Go," New! July 1993, page 72) and the PaperMax from Visioneer (see "PaperMax Scanner: Document Management for Real People," New! March, page 82). Now Logitech is entering the ball game.

### Everything on It

At first glance, Logitech's ScanMan PowerPage looks awfully familiar. Its hardware is identical to the Niscan Page—a scanner praised for packing crisp 400-dot-per-inch grayscale technology into a

TAIWAN-compliant parallel device small enough to fit on the most cluttered desk. Logitech added better software to support Nisca's hardware and is selling the whole package at the same price: \$799.

Once you've installed the software and plugged the PowerPage into the parallel port (no harder than slapping a Stanley Steamer into a bun and squeezing on the mustard), you slip an image or document into the scanner, and the control software pops up with four options: scan text, scan graphics, send a fax, or make a photocopy.

Sensibly, Logitech borrowed its OCR software from Caere. It does OCR with a few errors, but it still beats having to type in whole documents yourself. In our tests, it took about three minutes to scan and



ScanMan PowerPage is an easy scanner to share. It's compact, it weighs only a few pounds, and it plugs quickly and neatly into a parallel port. The included software is great, too.

recognize a letter-sized page—not bad, but more than twice the time taken by Visioneer's dedicated black-and-white scanner, the PaperMax.

### Graphics with Relish

What distinguishes the PowerPage is its handling of graphics. Visioneer's PaperMax 200-dpi, black-and-white scanning engine is good only for line art, and the graphics element in Nisca's Words&Pictures software is its weakest link. Logitech's FotoTouch Color retouching software, by contrast, is robust and versatile—alternating from grayscale photo editing to color painting with ease. And its handy monitor calibration feature helps ensure that the editing you do onscreen will actually make the output look better—something that's guesswork with many photo-editing programs.

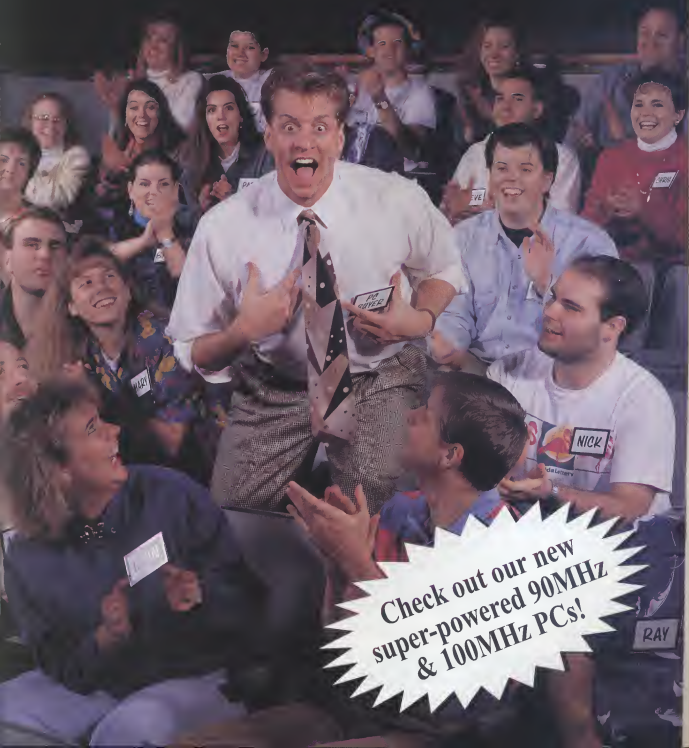
The bottom line is this: PowerPage is a strong all-arounder with tricks up its sleeve. Although it's not the fastest or cheapest OCR scanner in its league—that honor goes to Visioneer's \$499 Paper Management System—the ease with which the PowerPage faxes, photocopies, does OCR, and grabs graphics is unparalleled.

MATTHEW LAKE

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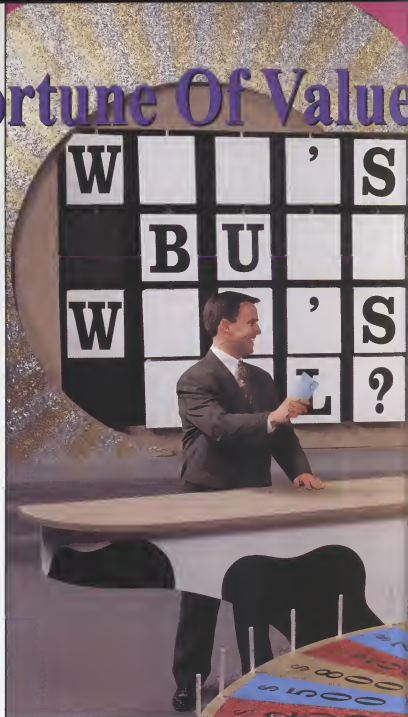
*PC Buyers jump for joy!* You're entering the exciting and competitive game of computer buying! We know you want to finish first with high-performance PCs and prize-winning service at the most affordable prices in the industry. It's no contest — with Gateway 2000™ you'll always be the winner!

And here are the stars of our show, Gateway's Pentium™-based systems! You'll get a shining performance with our new incredible **90MHz P5** system! And the stupendous performance of new lightening-fast hard drive systems! Screaming graphics controllers on the top two P5 models! Along with the most powerful Intel® processors available today! And (*drumroll please*) — all at 486 prices!

Intel's new **90MHz** processor gives our top-of-the-line, power-packed Pentium-based system the edge — it's one of the fastest PCs available today. And now in all Gateway 2000 P5 and 486 PCI systems, a new PCI/IDE controller allows the hard drive to transfer data up to twice as fast as non-PCI-based systems. The PCI/IDE controller enhances our Intel Pentium processor and PCI local bus for faster-than-ever data access!

Take full advantage of the performance-boosting PCI bus with high-end graphics controllers with 2MB VRAM on our top two P5 systems, for virtually unbeatable graphics! All other Gateway Pentium and 486 PCI-based systems come with a standard graphics with 1MB or 2MB graphics memory giving you up to 64,000 colors at 1024 x 768 resolutions.

Been spinning your wheels on how to get tomorrow's technology today and still pay 486 prices? With prices between \$2,495 and \$3,995, the puzzle is solved when you buy a Pentium-based system from Gateway 2000!



## The Bonus Round

Win big with a 486 PCI system that blows the competition away! You'll get the pinnacle of 486 performance with Gateway's new **100MHz DX4** machine priced at \$2,495. The Gateway P4D-100 includes 8MB RAM, a 540MB hard drive, double-speed CD-ROM, 15-inch color CrystalScan® monitor, 128KB cache, 1MB PCI local bus graphics and your choice of application software. And you can upgrade all of our 486 systems to Pentium technology in the future. It's another sure winner from Gateway 2000!



# With Gateway 2000!



## The Home Version

Fun and games are only part of what you get with the Gateway DX2-66 Family PC,<sup>™</sup> our best-selling Family PC model priced at only \$1,995! All Family PC configurations include full multimedia capabilities and software choices for the whole family, bringing productivity, education *and* entertainment into your home.



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# "X" Marks The Spot

*Looking for the perfect portable PC?* You'll get a celebrity performance when you choose Gateway 2000™ for the most value-packed portable PCs in the industry!



Gateway has all the right answers for incredible values with the ColorBook! Performance-enhancing features ... fast 486 processors and an incredibly big 10.3-inch screen on two ColorBooks models! ... make the ColorBook an undisputed champion.

Introducing the **ColorBook DX4-75** with a faster-than-ever processor! The substantial power boost of the 75MHz processor has made this model the fastest 486 portable available today. And that's not all. For your extreme viewing pleasure, an extra-huge 10.3-inch dual-scan VGA color screen is standard on the DX2-50 and DX4-75 models. You won't find anyone else with a 10.3-inch screen at a better price.

All ColorBook models — 4SX-33, DX2-40, DX2-50 and DX4-75 — have a host of great features. At less than 5.7 pounds and measuring an ultra-thin 1.77 inches, the ColorBook supports simultaneous video; has an easy-to-use, built-in trackball; two PCMCIA Type II slots; great battery life; and a suspend/resume feature so you can stop work anytime and resume later without losing data or restarting the system.

## **4H** GATEWAY2000 **ANDBOOK® 486**

The revolutionary Gateway HandBook 486 is perfect for all your worldly travels. This powerful little performer will forever change the way you use a PC. And you won't have to think twice about taking it with you — no matter where you



go. It's a no-brainer. The HandBook is so small (*about the size of a day planner*) and so lightweight (*it's less than three pounds*) that you'll never want to be without it!

Unless you mind all the extra attention, as described by a leading columnist: "I almost got mobbed the other day on the train. I was doing what I usually do on the commute: writing on a notebook computer. The only difference was that I was using a Gateway 2000 HandBook 486 ... I can't wait until everyone has one. Then they'll leave mine alone."



# For Portables!

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The HandBook is a real PC with a powerful 486 processor; an IDE hard drive up to 130MB; standard 4MB or 8MB RAM upgradable to 20MB; a 7.9-inch bright, backlit VGA display screen; 78-key keyboard; EZ Point™ integrated pointer; excellent battery life; and suspend/resume feature.



Looking for a square deal on the best portables around? The odds are stacked in your favor with Gateway's ColorBook and HandBook portable PCs.



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# The Surveys Say...

WHY GATEWAY 2000?

Scratch gold bars to reveal answers!

*Gateway 2000™ is the name of the game* when it comes to the best service and support. The Gateway family is made up of hard-working Midwesterners who are dedicated to satisfying our customers. And although we're a Fortune 500 company, we haven't forgotten our simple philosophy of providing an honest value, a superior product and the best service possible. In return, Gateway's loyal customers are always there to cheer us on. But you don't have to just take our word for it. The surveys prove it!

## Hands Down Winner in Service and Reliability

A big thank you to readers of *PC Magazine* who responded to a Service and Reliability survey with impressive results: Gateway. "In our latest survey, only Gateway 2000 gets our highest rating in both the desktop and laptop categories." The survey covered reliability, satisfaction with repair experience, satisfaction with technical support, and the likelihood of buying new PCs from the same vendor again.



*All the talented people appearing in this ad are Gateway 2000 employees.*



## PORTABLES

### HANDBOOK® 486

- Weight: 2.94 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- SL Enhanced Intel® 486 or DX2 Processor
- 4MB or 8MB RAM (expands to 20MB)
- 80 to 130MB IDE Hard Drive
- 7.9" Backlit VGA Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 1 PCMCIA Type II Slot
- EZ Point™ Integrated Pointer
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#### HANDBOOK 4SX-25

With 25MHz 486SX CPU, 4MB RAM and 80MB Hard Drive  
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 With 40MHz 486DX2 CPU, 8MB RAM, 130MB Hard Drive, Extra NiMH Battery and Leather Carrying Case  
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### PORTABLE OPTIONS

#### PCMCIA Cards:

- TelePath™ 14400/14400 fax/modem. **\$249**
- 9600/2400 fax/modem. **\$149**
- Ethernet adapter. **\$149**
- Token Ring adapter. **\$449**
- HandBook VGA adapter. **\$229**

#### Batteries:

- 2.2Ah NiMH batteries. **\$89**
- Alkaline battery pack. **\$29**

#### Diskette Drive:

- HandBook external 1.44MB. **\$99**

#### Cases:

- ColorBook \$49, HandBook \$55

#### Extended VIP Warranty:

- We'll ship a replacement within 24 hours during warranty.

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### COLORBOOK™

- Weight: Under 5.7 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
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- MS Works for Windows 3.0
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**COLORBOOK DX4-75**  
 With 75MHz DX4 CPU, 8MB RAM, 250MB Hard Drive and 10.3" LCD  
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 With 33MHz 486SX CPU, 4MB RAM, 120MB Hard Drive and 9.4" LCD  
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 With 40MHz DX2 CPU, 4MB RAM 250MB Hard Drive and 9.4" LCD  
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**COLORBOOK DX2-50**  
 With 50MHz DX2 CPU, 8MB RAM 250MB Hard Drive and 10.3" LCD  
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### COLORBOOK PACKS

#### Traveler's Packs:

- Case, extra battery & PCMCIA 9600/2400 fax/modem. **\$279**
- Case, extra battery & PCMCIA TelePath fax/modem. **\$369**



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If a system comes with "choice of application software," choose one of the following packages:

- Microsoft Excel for Windows™
- Microsoft Word for Windows™
- Microsoft Word and Bookshelf,® CD-ROM Edition
- Microsoft PowerPoint for Windows™
- Microsoft Project for Windows™
- Microsoft Access™ for Windows
- Publisher's Pack (CD-ROM only, includes CorelDRAW 3,™ ArtShow, MS Publisher 2.0 & MS Design Pack)

- The Entrepreneur Pack (Works,™ Publisher,™ Money™ & games)
- Borland Paradox® and Quattro® Pro for Windows spreadsheet
- Borland Paradox® and C++ (CD-ROM only)
- With desktop and selected portables you also get the following software and extras at no additional charge:
- MS-DOS 6.2 & Windows for Workgroups 3.11
- CoSession™ Host Remote Diagnostics (with all modems)
- QAPlus Diagnostics
- Gateway Computer Glossary
- Gateway Mouse Pad
- Systems with CDs also include:
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- On-Line User's Guide
- Gateway Mail On-Line Catalog

### SERVICE

Every Gateway system is backed by:

- 30-Day Money-Back Guarantee
- One-Year Limited Warranty
- Lifetime Toll-Free Technical Support
- On-Site Service Available To Most Locations
- Lifetime BBS Membership
- FaxBack Automated Fax Service

*Our money-back guarantee does not include shipping. On-site service is provided at no charge during warranty if our technicians determine it is necessary. If you'd like to read our warranty and guarantee policies, please call for a free copy.*



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You can also apply for our new Gateway 2000 DuoLine MasterCard® Card, issued by Dial National Bank, which lets you make purchases from Gateway and anywhere else MasterCard is accepted by giving you two lines of credit — one for Gateway purchases and one for all other purchases. For Gateway purchases, the card has no annual fee and a low variable interest rate of just 12.9% APR. For other



transactions, you get a variable interest rate of 13.9% APR and a low \$18 annual fee.\*

*\*Cash advance fee is \$1 plus 2% of the amount of the cash advance, but not less than \$5 nor more than \$10. Financing is available on approved credit with the Gateway DuoLine MasterCard, issued by Dial National Bank, Des Moines, Iowa.*

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Gateway 2000 also makes it easy for our neighbors in Canada and Puerto Rico to buy Gateway systems. You get award-winning technical support, CSA approvals, and on-site service that is available in most Canadian and Puerto Rican locations. Our international shipping rates are some of the most competitive in the industry. Canadian and Puerto Rican customers can reach us toll free at 800-846-3609. All other international customers can call us at 605-232-2000.

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## World Class Winning

PC World's 1993 World Class Awards found readers honoring Gateway 2000 with top honors in five categories including Best Service and Support (for the second year in a row!) and Best Mail Order Company. Thank you, PC World readers!

Jesse Berst, editor of *Windows Watcher* was quoted in *PC World*: "Gateway has discovered an amazing secret, give people more for less and they are going to like you." We knew our secret wouldn't be safe for long!



## Good Answers!

*Computer Shopper* summarized its readers' responses best: "Gateway, dominator of Best Buy balloting for the past three years, is your choice as Best Overall Supplier of computer systems ... For state-of-the-art PCs at bargain prices, North Sioux City is where *Shopper* readers look first." And "...Gateway 2000 has inspired a high degree of confidence and brand loyalty among *Shopper's* readers, who continue to rank Gateway's service and support as the best of all direct-channel PC vendors." Thanks *Shopper* readers!





## INTEGRATED SYSTEMS

### 4SX-33/4DX-33

- Intel® 33MHz 486SX or DX CPU
- 4MB RAM
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- Mini Desktop Case
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- MS-DOS® 6.2 & WFW™ 3.11
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### 4SX-33 FAMILY PC™

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- 101-Key Keyboard, MS Mouse & Joystick
- MS-DOS 6.2 & WFW 3.11
- Choice of Family PC Software
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### 4DX2-66 FAMILY PC

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- Double-Speed CD-ROM, 16-Bit Sound Card & Speakers
- 2400/9600 Data/Fax Modem
- 3.5" Diskette Drive
- 14" Color SVGA Monitor
- Mini Desktop Case
- 5 16-Bit ISA Slots
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### MULTIMEDIA KIT

- Here's everything you need to add multimedia to a Gateway desktop PC that has a CD-ROM drive. You won't find a better price anywhere!
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### P4D-66\*

- Intel 66MHz 486DX2 CPU
- 8MB RAM, 128KB Cache
- 540MB 13ms IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Color CrystalScan Monitor
- Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software

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- 8MB RAM, 128KB Cache
- 540MB 13ms IDE Hard Drive
- PCI Fast IDE Interface
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- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Color CrystalScan Monitor
- Baby AT Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
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- MS-DOS 6.2 & WFW 3.11
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- Intel 60MHz Pentium™ CPU
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- Double-Speed CD-ROM
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- 3.5" Diskette Drive
- 15" Color CrystalScan Monitor
- Baby AT Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
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- MS-DOS 6.2 & WFW 3.11
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- 16MB RAM, 256KB Cache
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- PCI Fast IDE Interface
- High-Performance PCI Local Bus Graphics with 2MB VRAM
- Double-Speed CD-ROM
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- 3.5" Diskette Drive
- 15" Color CrystalScan Monitor
- Baby AT Case
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- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software

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### P5-90

- Intel 90MHz Pentium CPU
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- 540MB 13ms IDE Hard Drive
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- High-Performance PCI Local Bus Graphics with 2MB VRAM
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 17" Color CrystalScan 1776LE
- Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
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OverDrive™ Processor



# Extra Winnings

You'll score bonus points with the peripherals listed below, sold only with the purchase of a system. Call our special component add-ons division at 800-846-2080 for our complete line of extras for Gateway customers.

## Multimedia

### Multimedia Kit

Here's everything you need to add multimedia to a Gateway PC that has a CD-ROM drive:

- Gateway 2000™ 16-bit CD-quality sound card, compatible with Sound Blaster™ cards, with MIDI/game port, mic in, stereo line in/out
  - 2 Labtec® CS-180 speakers
  - Microsoft® Encarta Multimedia Encyclopedia
  - Corel Professional Photos CD Sampler
- \$132** (with system purchase)

Get the multimedia kit with a CD-ROM for **\$299** (with system purchase).

### Yamaha® YST-M10 Multimedia Speakers

The small speakers that sound big and come with a tiny price! This free-standing, self-powered speaker set is a great value!  
**\$75**

### Altec Lansing ACS-300 Multimedia Speakers

Get superior stereo sound with these top-rated Altec Lansing ACS-300 speakers with separate powered subwoofer. **\$219**

## Communications & Storage

### TelePath™ II Fax/Modem

Internal fax/modem, 14,400bps modem, V.32bis, with 14,400bps fax capability. Package includes data and fax communication software, plus a CompuServe® trial membership. **\$149**

### Colorado Memory Systems® TBU

250MB internal automatic tape backup unit copies up to 9.5MB per minute. Comes with MS Windows™ and DOS® software, one tape and cable. **\$159**

## Networking

### Intel EtherExpress™

A 16-bit Ethernet adapter from a world leader in networking.

**\$105** Twisted Pair or BNC

### Ethernet Adapter from 3Com®

Manufactured by 3Com for Gateway.

**\$105** Twisted Pair **\$125** BNC

### Token Ring

IBM® 16-bit ISA Token Ring card. **\$429**

## Monitors

### CrystalScan® 17-Inch Monitor

Non-interlaced color monitor with intelligent multiscanning analog color display capable of ultra-high resolution up to 1280 x 1024 in non-interlaced mode and .26mm dot pitch. Upgrade from a 14-inch monitor **\$430**  
Upgrade from a 15-inch monitor **\$350**  
(Prices good only for upgrades at the time of system purchase.)

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### Epson® Stylus 800 Ink Jet Printer

Great laser quality at an ever greater value. Measuring only 17 inches by 10.5 inches, the Stylus 800 has seven different typefaces and prints an extra-quiet 150 characters per second at 360dpi. Parallel cable included. **\$289**

### Epson ActionLaser 1500 Laser Printer

The ActionLaser delivers professional-quality printouts. Fast six-page per minute speed, 14 resident fonts, 300 x 300dpi, and 1MB memory expandable to 5MB. Parallel cable included. **\$669**

## Home Office Pack

Add these peripherals to your new Gateway desktop, and you have everything you need for an efficient home office.

- Epson Stylus 800 Ink Jet Printer
  - TelePath II Fax/Modem
  - 1 Parallel Cable
- \$399**



## Envoy Plays Tunes, Sends Faxes, Dials out, and Answers the Phone

### SONG AND DANCE

When you've got so many functions in one chunk of hardware, management is crucial. Spectrum Envoy switches emulations using two pieces of software: the Aura Monitor and the Mwave Discriminator. Before any sound and communications program can trigger Envoy, it must be registered with the Aura Monitor. (This adds a step to each software installation, but it's not a problem.) To send a fax while the phone software is running, for example, the Mwave Discriminator must be running

SPECTRUM SIGNAL PROCESSING'S Spectrum Envoy is the pitchman's dream. It faxes, it answers the phone, it sings, it talks. It does everything but dance. You've heard this story before, you say? So have we, but the Envoy is the first product we've tested that measures up to the hype. Its secret: an Mwave-based digital signal processor (DSP)—a chip that's programmed to emulate various types of hardware—coupled with a thorough and well-integrated suite of communications software from different developers.

Run communications software—including the bundled

QuickLink II fax program—and it's a 14.4Kbps fax modem. Run any MCI Windows application, and it's an 8-bit sound card. And

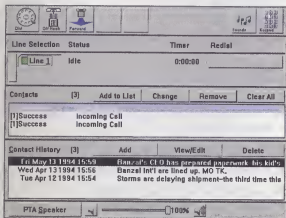
when the phone rings, it's a switchboard and answering service.

### I'm Not Here Right Now. . .

Envoy's answering service is provided by Octus Personal Telecommunications Assistant (PTA) software, a multitasking software receptionist that maintains a phone log and phone book, as well as rudimentary contact management and speaker-phone services. You can use it to greet incoming callers and keep them on hold listening to music or customized messages, or let callers record their own messages (stored as WAV files on your hard disk). If someone calls while you're out, you'll see a blinking message-icon on your screen when you return.

More important, the software supports a wide range of Centrex services provided by the phone company. If you subscribe to caller ID, call forwarding, multipoint conference calls, or automatic callback services, Envoy can act as the interface to these services. This alone is worth the product's price.

When everything is hooked in—the telephone services, the Spectrum



Your PC is a digital switchboard and contact manager. Spectrum Envoy's Octus PTA software functions as a simple contact management system with a phone log and phone book.

hardware, and the Octus software—you can view a list on your monitor of who has left messages, listen to the important ones first, and call them back with a quick mouse click.

### Sound Investment

There have to be drawbacks, right? True, but they are surprisingly few and minor. For one, the sound quality isn't stellar. The best you get is an 8-bit mono format sampled up to 14 bits, so it falls short of most current sound cards. Also, you can't currently run separate sound hardware alongside Envoy. There's no sound compression either—except the 8-bit sampling for WAV files—which means that long messages will devour disk space. And the telephony software doesn't handle branching, mailbox voice mail, or remote dial-in for messages, though Octus is working on this for the next version of PTA, which should be available as an upgrade for the Envoy board.

All told, Envoy is an excellent start for small businesses moving into digital telephony and faxing. It's not for game players, but it's a dream for home-office workers.

MATTHEW LAKE

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to arbitrate between applications. It intercepts the fax program's commands, calls a halt to the phone emulation, and reprograms the DSP to emulate a fax modem. It works so seamlessly that you forget it's there. You can't use all the hardware's capabilities at once, but we switched between functions without system crashes.



# We Scan Corrected.



You expect a scanned image to accurately reflect the color found in your original. Getting there, however, is usually no picnic. After scanning, precious hours are often spent adjusting the image in software to capture the truest blue, a faithful fuchsia, or for example, just the right kind of red in a ripe watermelon. But DCR™ has changed all that.

Now, when you purchase the **new, low-priced ScanMaker IISp single-pass color scanner**, you also get **DCR, Dynamic Color Rendition**, an advanced, yet easy-to-use color calibration and correction system. DCR actually calibrates the ScanMaker IISp to a photographic industry-accepted calibration target, creating a custom color profile of your

specific scanner, ensuring the most accurate color possible as you scan the image. But don't take our word for it. Here's what *PC Magazine* said in their February 8, 1994 issue: "...this mechanism (DCR) seems to have worked well, because the ScanMaker IISp's color output was clearly the best of any scanner in our survey."

So, even if you need to capture the bright yellow flesh of a Honeyheart watermelon, like the wedge on the left, the quickest way to do it is with the new ScanMaker IISp with DCR.

For more information about the ScanMaker IISp, DCR, your nearest authorized Microtek reseller, or a **FREE** copy of *The Scanned Image*—a scanning primer, call **1-800-654-4160** or fax (310) 297-5050.



*The ScanMaker IISp accurately captures millions of brilliant colors at resolutions up to 1200 x 1200 dpi through software interpolation (300 x 600 dpi optically). In addition to the DCR color calibration/correction system, the ScanMaker IISp is bundled with Adobe Photoshop 2.5 LE for either Windows or Macintosh. Windows users also get Corel's PageKeeper Portfolio document and image management software.*



Get a hands-on demonstration of the ScanMaker IISp with DCR and find out more about accurate color scanning by attending Focus Seminars' "ColorRight, Color Correction & Reproduction Workshop." For dates and locations, call Microtek at 1-800-654-4160.

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## Beyond Video: Collaborate With IBM's Person to Person

### GOING DIGITAL

Even a year ago, we would have snickered at the idea of basing an application on what was largely considered a stilled technology: Integrated Services Digital Network (ISDN). But now several major desktop-conferencing vendors, Intel and PictureTel included, are relying solely on ISDN for their applications, and even IBM's Person to Person requires ISDN links for on integrated audio and video conference.

So what is it and how do you get it? Simply put, ISDN lines replace analog phone lines with digital ones. Each Basic Rate Interface (BRI) ISDN line has two 64-kilobit-per-second (Kbps) channels for voice and data, and a third 16Kbps channel for signaling data. The stumbling block with ISDN is that outside of a few of the "ISDN islands" there is still no widespread coverage. The stumbling block with ISDN is that currently only major urban areas have ISDN coverage, and even that is usually limited to business districts. But this is changing as local phone companies, prodded by industry powerhouses like Intel, start installing more digital switches. According to regional phone companies, you can expect ISDN coverage across two-thirds of the country by the end of this year, and across three-quarters by the end of 1995.

YOU COULD ARGUE that, for all the hype, videoconferencing is still a solution in search of a problem. After all, in a world of e-mail, teleconferencing, voice mail, and old-fashioned real-time phone calls, do we really need to see a talking head—even one that is hundreds of miles away—to do business effectively?

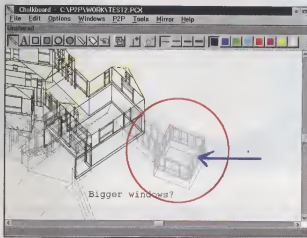
Probably not. And fortunately, one of the latest applications to include the sizzle of videoconferencing, IBM's Person to Person (also known as P2P), has a lot more than simply shared video: You can use a shared clipboard and transfer files, chat in real time, and, most importantly, share a "whiteboard."

### Share and Share Alike

P2P includes a host of collaboration utilities, but the most useful is the Chalkboard, generically known as a shared whiteboard. The Chalkboard can display the contents of a window or clipboard, or a text or image file from one of the shared systems. Once the contents are loaded, any participant can mark up the image using the Chalkboard's drawing tools, then synchronize the changes to other users' machines with the click of a button.

Communication during a session isn't limited to doodles on the Chalkboard. P2P also includes a Talk utility for both private and group communications. We also liked P2P's shared clipboard, which lets you paste information from one machine into another, and even supports DDE links as long as a session is running.

And, of course, there's shared video. You currently have to use Intel's ActionMedia II adapters for video support, although users who don't have the right hardware can opt for software video emulation. But we think real-time videoconferencing is overrated, especially because the LAN version of P2P doesn't support audio. To make a complete connection you have to initiate both a P2P



With Person to Person, users across a network can view, graphically annotate, and make comments on the same file or image. In this case, the Chalkboard utility helps mark up a CAD drawing.

call and a regular phone call. Then, once you get past the thrill of seeing the jerky, 15 frame-per-second images of a colleague in a postage-stamp-sized box on your monitor, you'll probably realize that, unlike the Chalkboard or even the file-transfer utility, it doesn't increase productivity. In fact, if you disable the real-time video support, you can capture video stills and share them among the participants using the Chalkboard, which, to our minds, is a more effective use of the hardware for applications like insurance claims or training new staff.

### Multiple Links

P2P is one of the more flexible conferencing packages available because it works over NetBIOS and TCP/IP networks, Integrated Services Digital Network (ISDN) links (see "Going Digital," at left), and even modem lines. Considering the time and money it could save you in traveling costs, we think it's well worth the price, which comes to less than \$200 a seat—not including the video hardware—if you buy a ten-user license. And it works across both OS/2 and Windows machines.

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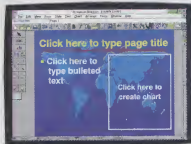


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## Easy Does It with SofNet's FaxWorks Pro LAN

### PULLING IT TOGETHER

Why can't all fax software be this simple? You used to have to jump through all kinds of hoops to assemble faxes from multiple sources. But with FaxWorks Pro LAN 3.0 from SofNet, you

IF YOU'RE LOOKING for a no-fuss, no-muss way to let people in your workgroup send and receive faxes from their PCs, then SofNet's FaxWorks Pro LAN 3.0 is just the thing for you. Although the program lacks some high-end bells and whistles, it does a great job of simplifying network faxing.

FaxWorks Pro LAN is even easy to install. The server software can go on a dedicated machine or on a workstation. During installation, it examines your serial port, phone line, and modem, and it automatically configures itself.

We were impressed: This was the first automatic configuration program that correctly set up our finicky QuickComm Spirit II modem. After you copy software to workstations and assign individual user rights, your workgroup is ready to fax.

### Keeping Track

At the heart of the Windows workstation software is FaxTracker, a single dialog box that lets you access the send and receive logs, FaxWorks Pro LAN's filing-cabinet-based archival system, and a file list for point-and-click fax attachments.

All of this simplicity doesn't come at the expense of performance. FaxWorks Pro LAN includes high-end features such as automatic forwarding of faxes, OCR, and thorough annotation capabilities.

The OCR functions are straightforward to use and as effective as any we've seen (in other words, they're less than great—current OCR technology simply can't reliably translate faxes into editable text without a lot of manual cleanup work).

The price you pay for FaxWorks Pro LAN's mix of simplicity and power is a lack of super-high-end features. Unlike Delrina's WinFax Pro

for Networks, for example, FaxWorks Pro LAN can't route faxes through network e-mail, nor does it let you send faxes through multiple modems attached to multiple fax servers. (See "Reach out and Fax Someone with Delrina's WinFax Pro 4.0," on page 50.)

### Fax Basics

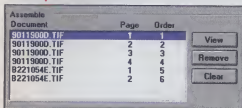
In addition, unlike the newest generation of fax software, FaxWorks Pro LAN doesn't support Binary File Transfer, an emerging standard for transmitting binary files along with faxes.

It also doesn't support the Microsoft At Work standards, which slowly are gaining support among fax software and stand-alone fax machine vendors.

Still, FaxWorks Pro LAN is a winner. Although it is not as powerful as WinFax Pro for Networks, it is about half the price and includes software for both DOS and Windows workstations. If you don't need advanced capabilities such as Microsoft At Work (and at this writing, who does?), FaxWorks Pro makes network faxing about as simple as it can get.

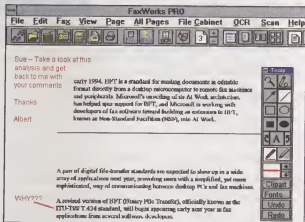
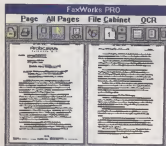
DAVID HASKIN

**FAXWORKS PRO LAN 3.0** • \$199 FOR 2 USERS, \$599 FOR 10 USERS, \$999 FOR 25 USERS • SOFNET • (800) 329-9675, (404) 984-8088  
Circle No. 627 on Reader Service Card



simply point and click. Say you need to send a fax comprising three separate items: a technical diagram, product instructions you previously faxed, and a question that a customer faxed to you. Using the FaxTracker interface, select the faxes and image and then click on the Assemble button to bring your documents together (above).

Click on another button and FaxWorks Pro LAN shows you thumbnails of all of the fax pages and images (below). Annotate, delete, or change the order of any of the pages simply by dragging and dropping. When the assembled fax meets your approval, just click on another button to send it on its way.



FaxWorks Pro LAN 3.0 offers a host of convenient features, including a floating toolbar that lets you access virtually all annotation functions with the click of a button.



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## Useful CD Software: Home Design, Label Makers—And Comic Books

YOU DON'T KNOW what to expect from software these days now that CD-ROM is here. Some disks seem full of promise but stumble over their multimedia. Other programs that sound like real yawners are full of unexpected delights because they cram so much onto a CD. Here's a collection of pleasant and not-so-pleasant surprises.

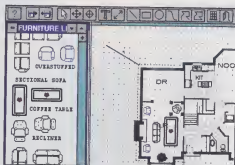


- *We laughed, we cried, we killed a whole weekend. A masterpiece.*
- *Get your own copy. This is ours!*
- *Justifies the dough you blew on the CD drive.*
- *We'd rather watch "Lifestyles of the Rich and Famous."*
- *Perfect—for a skeet shoot.*

### Expert CD-ROM Home Design, Gold Edition for Windows ..... ●●●●●



At first glance, you might take this to be an overreaching program that will be hard to use and produce laughable results. It's supposed to let you design a home or an add-on and play interior decorator with the furnishings. Come on, *real* architects have expensive, complicated programs like AutoCAD to do this sort of thing. What can a program like this do?



Use Expert CD-ROM Home Design, Gold Edition for Windows to play what-if with furniture and walls.

Quite a lot. OK, you can't use it to produce blueprints for a contractor, but you can hack out a decent floor plan of your home in a half-hour and play with additions, furniture arrangements, and other changes—and it's a lot easier than hauling a couch from one room to another. Several libraries of furniture let you populate your dream house with dream furnishings. There are video tips on design and working with tools, and background music which, thankfully, you can turn off.

Our only complaint: The program doesn't include the 3-D walk-through capabilities for your own designs found in Expert 3-D Home Design for Windows, from the same company. That would have made it way cool.

(Continued on page 84)

### KEEP TELLING ME ABOUT YOURSELF—YOU WON'T BE LONELY, TEX

*Now virtual reality has everything, including insults and frustration.*

The box featured a beautiful woman in a low-cut gown and billed itself as "The Ultimate Social Adventure." Ah ha, I thought, another seedy ROM. But maybe *Man Enough* was different. And besides, what red-blooded male can resist the challenge in the title?

Well, this is not pornography. It is something much worse. It is a program guaranteed to take any man back to his acne-ridden youth, when his only purpose in life was to be fodder for put-downs by cheerleaders. The

multimedia DOS program consists of verbal exchanges between you and six beautiful women presented in video, stills, and scratchy sound. The object is to select the best pick-up lines.

If you cheat (not hard to do), you can be treated to all sorts of promises of sexual bliss. But as you're about to join the mile-high club, the plane's fuel runs low. As you get ready for a roll in the meadow, her beeper goes off.

This is a game that spends most of its time having beautiful women insult you.

And, if you can put up with that, it finally winds up being a giant tease. It's like creating a spreadsheet program that makes fun of your budget estimates as you enter them into the cells and then refuses to total them.

This is about as perverse as you can get—virtual reality for the masochist. I'll take my insults the old-fashioned way—from friends and family. . . . ●

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## MOM Knows Best

☐☐☐☐ It used to be a big deal if the computer back you bought had a floppy disk inside. That's so common now, it doesn't even rate a ha-hum. But here's something to get excited about: **CD-MOM: The Mother of All Windows Books CD Version**. Not only is the book written by *PC/Computing* columnist Woody Leinhardt and Barry Simon—two people whose insanity is rivaled only by their knowledge of Windows—but it includes a CD that, by itself, would justify the book's price tag of \$49.95.

The book is full of hints to



improve Windows performance and make it easier to use.

The CD has two major programs—WinSlouth Gold Plus, one of the best diagnostic programs you can buy, and WinCIM, a communications program for CampusServe. And there are 100 Windows shareware utilities to help you customize Windows into a mean, lean computing machine—start of... you know Windows. Throw in hundreds of other goodies, and you have enough to keep busy until Windows 4.0 comes out.

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CDs, continued from page 82



The New Grolier Multimedia Encyclopedia is a good learning tool, but not quite the tour de force that Compton's Interactive Encyclopedia proved to be.

## The New Grolier Multimedia Encyclopedia ..... ☐☐☐



This Windows CD is a disappointment only compared to *Compton's Interactive Encyclopedia* (see "Best CDs Yet for Cheating on Term Papers, Catching Up on Politics," April, New! page 76). Grolier is a decent online encyclopedia, but it lacks Compton's InfoPilot that gathers related information from seemingly diverse topics. Links to graphics were few and far between, although we did like the animations and would like them more if there were more than 27 of them. It has 50 videos, from mold growing on bread to Nixon's farewell speech—again, there should be more.

But what really disappointed us was the main article on computing, which dismissed personal computing with this whopper of an oversimplification: "In the 1980s, some attrition occurred in the crowded personal computer field, with Apple and IBM remaining particularly strong." Well, that answers all of our questions. OK, there is a separate article on personal computing, but the kiss-off in the main story makes us think Grolier has yet to catch up with the times.

## FreeX ..... ☐☐☐



Here's a disc we didn't expect to like. After all, it's just a comic book on CD. Why put a bunch of static images into a multimedia program? Well, as it turns out, those static images—some of which have just a modicum of animation after all—work wonderfully with a multimedia soundtrack of dialog, music,

and sound effects. And on a 256-color display, the artwork is richer than you'll find in a hard-copy comic book. In fact, this CD proves that well-done static illustrations are more attention-getting than all those multimedia action videos that are supposed to add real pizzazz to your presentations.

Of course, comic book art is an acquired taste, but those who have scorned it in the past would probably love to have a first-edition of *Batman* right now for the collector's value. Will the same be true of CD comics? This is one CD we think we'll hang on to.

## MyAdvancedLabelDesigner ..... ☐☐☐



There's not a lot of reason for *MyAdvancedLabelDesigner* to be on CD-ROM, except that it speaks well for the future distribution of software. Everything on the disc adds up to only about 28MB, and with compression it could have been distributed on ten or so floppies. But installing it from CD is much easier; let's hope other software publishers continue the trend.

As for the program itself, it's the ultimate label designer. With most of its 28MB devoted to artwork, you can embellish your labels in a thousand ways. It can do anything you'd want a label to do—except import data directly from databases or spreadsheets.

If you would like to print from *MyAdvancedLabelDesigner*, you have to enter your address list manually or import it from an ASCII delimited file. We don't care. This is a niche application. The important thing to us is that it foretells a day when all software larger than one or two floppies, even niche programs, will come on CD.

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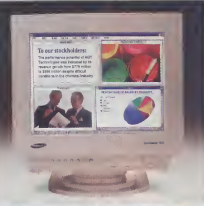
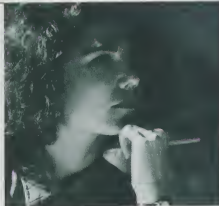
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SyncMaster	14GL	15GL	17GL
Size	14"	15"	17"
Dot Pitch	.28	.28	.28
Maximum Resolution	1024 x 768	1024 x 768	1280 x 1024
Maximum Refresh Rate at Maximum Res (Hz)	75	76	60
MPR-II (Low radiation)	•	•	•
Power Management	•	•	•
Flat Square Screen	•	•	•
On-Screen Programming	•	•	•
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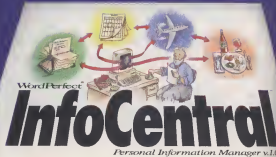
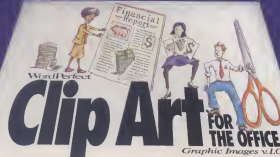
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### Buy Time with DX4

Thinking about buying a Pentium-based machine? Wait. Intel recently announced the DX4 chip, a midlife kicker for its 486 processor line that runs about 45 percent faster than its 486DX2/66.

The first desktop version of this power-conserving, 3.3-volt family has a 100MHz internal clock, but it can be plugged into existing 5-volt 486 motherboards with either 33MHz or 50MHz external processor buses. For example, AT&T is adding a DX4-equipped CPU card to its AT&T 3325 DX4 (\$2,165 to \$3,380; AT&T Global Solutions; 800-225-5627) **Circle Reader Service No. 635**

AST Research was quick to take advantage of the DX4's SL-enhanced power management to power down the motherboard and monitor of its new Bravo LC 4/100t during periods of inactivity, something you can't do with Pentiums. (\$1,900 to \$2,800; AST Research; 800-876-4278)

**Circle Reader Service No. 636**

In a similar vein, a cool-running 75MHz notebook version of the DX4 is being retrofitted onto the motherboards of several notebooks, including Texas Instruments' TravelNote 4000E WinDX4/75, Toshiba's T4800CT (see "The First 75MHz DX4 Notebooks!" New! page 36), and Compaq's DX4-based LTE Elite, which eliminates the external AC adapter and still weighs less than 7 pounds. (\$3,299 to \$6,499; Compaq Computer; 800-345-1518) **Circle Reader Service No. 637**

Intel's chip-level tests show that the 100MHz DX4 runs 17 percent slower than the 60MHz Pentium. But PC/Computing's application-oriented tests have shown that systemwide performance varies among PCs with the same processor. A well-designed DX4 system could run as fast as its Pentium-based counterparts.

Better still, Intel estimates that a reasonably configured 100MHz DX4 should sell for around \$500 less than the same PC with a 60MHz Pentium.

## BRIEFLY NOTED: HOT PRODUCTS AND UPGRADES. BY MIKE HOGAN

### 501 Windows Tips

Still not comfortable navigating Windows' "easy-to-use" graphical environment? The editors of PC/Computing have compiled 501 Windows Tips to help you optimize WIN.INI and other system files, better utilize File Manager, run DOS applications more smoothly, and much more. To download this free file, log onto PC/Computing's PC/Contact menu on the ZiffNet forum on CompuServe and download PCC501 from the Hot Tips/Secrets menu on library 1 (Utilities/Misc.). To run the file, just type WINHELP PCC501. (Free, not including CompuServe costs; PC/Computing; 800-848-8990) **Circle No. 641 on Reader Service Card**

### M.Y.O.B. Small Business Accounting

With Version 4.0 of this small-business accounting program, you get an integrated payroll module that automatically calculates earnings, deductions, taxes, and other payroll stub sections. In addition to posting continuously updated amounts in the proper accounts, M.Y.O.B. now lets you set up batch functions to send multiple invoices and letters and pay regularly recurring bills. (\$199.95, \$99 without payroll module; BestWare; 800-322-6962, 201-586-2200) **Circle Reader Service No. 642**

### Report Generators

New reporting add-ins for the modular Armor Premier Accounting program include the Report Generator W-2 Format module, which creates and batch-prints W-2 forms for multiple employees and employees from different states. Report Generator Report Pack III offers a bundle of eight popular report formats that integrate with the program's Billing, Order Entry, Time Billing, and Purchase Order modules. (\$50 for Report Generator W-2 Format, \$395 for Report Generator Report Pack III; Armor Systems; 407-629-0753) **Circle No. 643 on Reader Service Card**

### Quant IX Portfolio Manager 5.0, Portfolio Evaluator 5.0

These two updates of Quant IX differ primarily in the degrees of security analysis they offer. Quant IX Portfolio Manager's comprehensive tools can track a variety of asset types, including stocks, bonds, mutual funds, even options and securities bought on margin. Quant IX Portfolio Evaluator then slices and dices your security list by all the standard performance measures—price/earnings, dividend performance, earnings growth, and book value. But it also offers more accurate analysis variations based on cash flow—even alpha and beta characteristics of stocks. (\$59 for Quant IX Portfolio Manager, \$99 for Quant IX Portfolio Evaluator; Quant IX Software; 800-247-6354, 414-961-1991) **Circle No. 644 on Reader Service Card**



### Keep It Covered

A Kangaroo cover will keep dust, coffee spills, muffin crumbs, and unidentified flying objects at an even lower order from invading your PC. These clear Plexiglas cases completely enclose your monitor and PC, and they also provide fans for cooling and sealed ports for cables. (\$469; Systems Alternatives; 419-891-2880) **Circle No. 639 on Reader Service Card**



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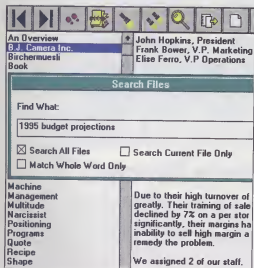
Are you one of those people who needs to keep track of disparate kinds of information—such as letters, stray thoughts, brainstorming ideas, addresses, phone numbers, and lists—but has no way to do it? If so, you should give InfoRecall a spin. This unique Windows-based information manager lets you create records in a free-form manner, link them through hypertext, and then browse through them with sophisticated searching tools.

If you like what the shareware version does for you, keep your eyes peeled for the commercial release of InfoRecall 4.0 later this year. In addition to basic

Boolean text searches, you'll be able to search the free-form InfoRecall database for numbers, and you can search by dates. It will also include print merge and print preview, as well as interface improvements and DDE support.

The shareware version can be downloaded from PC/Contact, *PC/Computing's* forum on ZiffNet, as INFO34.ZIP in library 3 (Utilities/Misc.). It can also be ordered for \$69.95 from Phantec, 200 Yorkland Blvd., Suite 801, Toronto, ON M2J 5C1 Canada.

Circle Reader Service No. 645



## Great Deal on Multimedia Edition of 1-2-3 for Windows

Lotus 1-2-3 has gone multimedia—and you can get it for a rock-bottom price. Release 4 is now available in a multimedia edition that includes animated learning tools, a voice-oriented proofreader, and ScreenCam, a feature that allows you to capture your screen activity, cursor movements, and sounds; create onscreen “movies” with them; and share these movies with others. Call LotusDevelopment at (800) 343-5414 for details.

Circle No. 646 on Reader Service Card

## Test Dozens Of Commercial Programs—Free!

Looking for a way to try commercial software before buying it? Get a copy of CD-Select, which features demos of Excel 5.0, Visual Basic, and dozens of other programs. If you decide to buy one, simply call CD-Select with a credit card number to access a fully functioning version of the program. CD-Select costs \$3.50 for shipping and handling. Call CD-Select at (800) 344-2495 for details.

Circle No. 647 on Reader Service Card

## BEST SOFTWARE BUYS

Where can you get the best software deal? Usually through the mail. We surveyed mail-order houses and came up with the best prices we could find. The following prices include shipping and handling charges but don't include credit-card surcharges. Prices are as of press time and are subject to change.

PRODUCT	LIST PRICE	BEST PRICE	SOURCE	READER SERVICE NO.
MS-DOS 6.2 upgrade	\$77.95	\$48.95	MicroWarehouse, (800) 367-7080	649
Excel 5.0	\$495.00	\$298.00	Lomo, (800) 369-2846	650
Lotus 1-2-3 4.0i	\$339.00	\$289.00	Bulldog, (800) 438-6039	651
Word 6.0 for MS-DOS	\$495.00	\$289.00	CompUSA, (800) 451-7638	652
Norton Utilities 7.0	\$179.95	\$115.00	Bulldog, (800) 438-6039	653
QEMM-386 7	\$99.95	\$62.98	PC Zone, (800) 252-0386	654
Quattro Pro 5.0	\$495.00	\$43.94	Egghead, (800) 344-4323	655
Windows 3.1	\$149.95	\$91.95	PC Zone, (800) 252-0386	656
WordPerfect 6.0 for DOS	\$495.00	\$275.00	Lomo, (800) 369-2846	657
WordPerfect 6.0 for Windows	\$495.00	\$276.99	ET Voluntee, (800) 395-1000	658

## Get Recycled Laser Toner Cartridges—Cheap!

Anyone who owns a laser printer knows that once you buy one, the real costs have just begun. Toner cartridges, in particular, tend to be exceptionally pricey. There's good news, though: Now you can help the environment and go easy on your checkbook, too.

Hewlett-Packard recently cut the price of its remanufactured HP Optiva 95R toner cartridge for LaserJet II, IID, III, and IIID printers to a suggested retail price of \$79. For information, call Hewlett-Packard at (800) 527-3753.

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- 300 dpi Ink Jet Printer
- 14" SVGA, 28mm Monitor

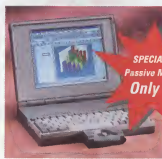


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## Software Saleswire

WordPerfect's ten-year domination fades; Microsoft Word continues a six-month surge.

**PRICE COLLUSION?**  
Our friends in Redmond help define the magic price point for business applications: \$495.

BUSINESS APPLICATIONS	VENDOR	PRICE	COMMENTS	FEB	MAR
Word 6.0 for Windows	Microsoft	\$495	AutoCorrect works automatically.	10	1
Excel 5.0 for Windows	Microsoft	\$495	Smart what-if scenario creation.	3	2
PowerPoint 3.0 for Windows	Microsoft	\$495	Supports embedded sound.	29	3
Paradox 4.5 for Workgroups	Borland	\$495	Easy access to remote data.	-	4
Access 1.1 for Windows	Microsoft	\$495	Supports Sybase, Oracle, and FoxPro.	15	5
Lotus 1-2-3 4 for Windows	Lotus	\$495	Fill-by-example for simple sequences.	2	6
Office 4.0 for Windows	Microsoft	\$750	Strong cross-platform compatibility.	1	7
Quattro Pro 5.0 for Windows	Borland	\$50	SpeedFormat allows easy design.	8	8
Procomm for Windows	Datostorm	\$179	Fully automated dialing directory.	11	9
WordPerfect 6.0	WordPerfect	\$495	Easy graphics using Page mode.	4	10

**DOING WINDOWS**  
QEMM 7, Norton Desktop 3.0 for Windows, and Uninstaller 2.0 for Windows all enhance Windows—until the next upgrade from Microsoft renders them obsolete. Coveit empor.

UTILITIES	VENDOR	PRICE	COMMENTS	FEB	MAR
MS-DOS 6	Microsoft	\$129	Improved DOS/Windows backup.	2	1
QEMM 7	Quarterdeck	\$100	DOS-Up breaks the 640K barrier.	5	2
Windows 3.1	Microsoft	\$149	The standard for business apps.	1	3
AfterDark 2.0 for Windows	Berkeley Systems	\$50	Digital sound without hardware.	8	4
Norton Utilities 7.0	Symantec	\$179	Supports high-capacity drives.	11	5
Windows for Workgroups 3.11	Microsoft	\$250	Perfect for task-sharing environments.	4	6
Norton Desktop 3.0 for Windows	Symantec	\$179	New backup and antivirus features.	14	7
OS/2 2.1 for Windows	IBM	\$224	Exploits high-end 32-bit power.	3	8
HJook Pro 2.0	Inset	\$169	Preview mode for image files.	-	9
Uninstaller 2.0 for Windows	MicroHelp	\$79	Deletes all traces of a Windows app.	15	10

**TAXING VICTORY**  
TurboTax reasserts market leadership after a slow start. Quicken, QuickPay, TaxCut, and QuickBooks follow closely behind.

PERSONAL PRODUCTIVITY	VENDOR	PRICE	COMMENTS	FEB	MAR
Quicken 3.0 for Windows	Intuit	\$70	Sign up for your Intuit credit card today.	3	1
TurboTax 1993	ChipSoft	\$70	EasyStep acts as tax-paying guide.	-	2
Quicken 7 for DOS	Intuit	\$70	Financial Calendar matches Windows.	1	3
TurboTax 1993 for Windows	ChipSoft	\$70	ToxGraph tracks income, cash flow.	-	4
QuickPay 3.0	Intuit	\$75	Complete payroll process.	4	5
CompuServe Membership Kit	CompuServe	\$50	Easy access with robust button bar.	-	6
TaxCut 1993 for Windows	MECA	\$80	Navigator keeps you in line.	19	7
QuickBooks 2.0	Intuit	\$140	QuickFill limits repetitive data entry.	3	8
The Print Shop Deluxe 1.2	Broderbund	\$50	Easy color for monochrome graphics.	8	9
ColorDirector Plus	SoftKey	\$80	Loads of clip-art images.	17	10

Software Saleswire is compiled by G. Meier Inc. once each month after gathering ranked-order sales information supplied by the following software industry sources: 800 Software, ABC Distributors, American Software, Bob-bages, Baker & Taylor Software, CompuUSA, Computability, Computer Discount Warehouse, Corporate Software, Dustin Discount Software, Egghead Discount Software, Electronics Boutique, Gate/PA, GTSI, Ingram/Micro, Jasta Distributing, Kenfil, Luskil Int'l, Marisal, Multiple Zones, Navarre, PC Connection, Software Resource, Software Spectrum, Software, Etc., and Woldensoftware. They represent sales through tens of thousands of resellers and more than \$6 billion of software sales. A weighting system is applied to each entry based on three factors: the entry's position in the individual chart, the power of the contributing source based on annual gross sales, and the relative strength of a source in a given category of software. All prices are suggested retail and are subject to change.





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	West	\$163,200
Beepers	East	\$139,600
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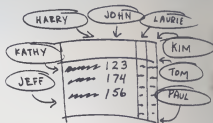
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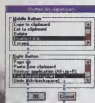
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# A Look at the Computer Issues Of the Future (Ick!)

[Note to editor: As you know, I always write snide comments to myself when doing this column. I've tried to remove most of them. Make sure you take out the rest. OK? ... John]

IT'S TIME TO LOOK AT THIS YEAR'S THEME COLUMNS (b-o-r-i-n-g). Every year, columnists spend some time with a glass of Palo Cortado (yeah, right) and spend a few contemplative hours (10 minutes) in an attempt to discover within themselves the important themes for the next 18 months. There's nothing more important (except asking for more money or watching TV) to a columnist than making certain that the public is getting the information it deserves (hah). While the ads and features provide a lot of information, the columnists provide all the insight (except for Penn Jillette).

Here are the interesting (if you're bedridden in an Iraqi prison, maybe) topics that I believe will be the focus of many columnists' writings over the next year or so (next decade, if they can get away with it). You'll find many of these issues in my columns, for sure (over and over, if I can get away with it).

First there's the PowerPC. This is the new RISC chip from that Apple-IBM-Motorola consortium (talk about a weird group of people getting together—can you imagine!). Expect to see articles about how great it is (written by people who don't know a potato chip from a silicon chip) as well as criticism of it (by stooges for Intel).

## The Great Marketing Challenges (Har Har)

A lot of discussion will be about how IBM intends to market the chip in a system (I'm still not convinced they can even spell the word *marketing*). Some discussion will be about Apple's versions of the PowerPC system (written by people who still have trouble using a mouse). And there will be the inevitable discussion (ramble) about how the two platforms—Mac and PC—will merge (in a pig's eye).

While on the subject of Apple (duh, what a transition!), we can expect to see a few articles on Apple's potential licensing (what a joke) of its System 7 operating system in the PC world (I can't stop laughing—Timmy, can you say, "lack of device drivers?"). There will be a lot of solid testing by the labs (let's see what happens if we drop it off a cliff) and debates over its viability as an operating system (here come the Microsoft PR people!).

Then we can expect what I call the "regular" (running out of material already?) issues, which look like they have life (like a corpse) left in them. (Where's Jack Kevorkian when we need him?) At the top of the list (dung pile) is:

"Where will the next killer application come from?" Will it come from a big company (any minute, hardly har har) or from some small garage operation (developed by a psychopath with no life). Some will argue that the future is now with the well-financed big corporation (Microsoft lackeys), while others will support the small-time operators (dreamers).

Then we have the good old, "Let's complain about the computer store" column (can anything be easier than writing one of those?). What's particularly amusing is that few computer stores (very very few) carry a selection of good magazines. This is because the magazines have too many direct-mail ads that computer stores see as competition to their business (talk about paranoid). So, the computer store employees never read these columns (if they can read at all—hehehehe). I think once in ten years a computer store owner wrote in about one of these columns (he used a crayon) to rebut some assertions. Anyway, it's easy pickins, so expect more columns about retail.

## The Comeback Contingent (Who?)

Next on the column agenda will be musings about IBM and its comeback. Will it make a comeback? (Yes, then Gerstner will quit. That should be fun to watch.) Or will it just be another bloated, too-big-for-today's-world company? (How about both a comeback and bloated?)

This brings us to Digital Equipment Corporation. (Who? Is that company still in business?) Where does it fit into the scheme of things? (I'm sure it wished it knew too!) Some columnists will look at the various minimakers trying to get a foothold in the micro arena (how can they stop laughing while writing this stuff?) and the future

*We can expect the "regular" (running out of material) issues.*

of the midrange computer (landfill).

Then we have the Internet (the information dirt road) and its impact (as a time-waster) on society. Newcomers (rubes without a clue) to the field of column writing (pontificating) sometimes get caught up in the Internet phenomenon, and we'll see a lot of (thousands of gag-gag goo-goo) positive articles (drive!) affirming the importance of the Internet in today's world (gag, puke).

And finally, as networks become more and more popular (yawn, snooze), many writers will discuss the importance of being connected (only because their editor made them do it), and how connectivity is more important than ever (we can use these articles as a substitute for barbiturates). The next few years look exciting indeed! (Not!) ■





# Blast Off with Captain Industry! Or, How I Got My Boss's Photo

I HAVE SEEN THE FUTURE OF CORPORATE PHOTOGRAPHY. Its name is Digital.

The job: getting the corporate photograph of my boss, Walt, said object being essential for the production of the annual report.

The problem: Walt hates to have his picture taken. *Hates* is perhaps the wrong word. Loathes. Abhors. Abominates. All are fitting. He also despises the individual responsible for putting him in a position he detests. That's me.

The problem, part deux: Walt takes a terrible picture. If posed formally, as he likes, he freezes up and looks like the contents of an Egyptian sarcophagus let out for a ceremonial procession. Candid photos are almost as bad, since Walt has the ineffable ability to shut his eyes, scratch his nose, or simply look massively unhappy whenever the shutter is about to do its thing. He also devotes up to 15 scant minutes to the session, which he insists should be "a no-brainer."

Success to date: none. When the shots come back and are horrible, Walt makes me use the picture of him that's been his favorite since Jimmy Carter was a bright new outsider challenging the status quo in Washington.

The answer: Joanne Dugan, photographer, of New York. Dugan is different. Dugan does digital.

**High-tech toys for big-exec tots.** Dugan arrived with hardware, and Walt perked up immediately. Nobody had ever brought such neat gizmo objects before, and Walt loves doodads, geegaws, and electronic Frisbees of all kinds.

"Whatcha got there?" he said, losing his reticence immediately and plumping himself down at the table where Dugan was setting up.

Dugan showed my boss her Nikon 8008S, which looked to be pretty normal except for the large Kodak hard drive unit attached to its back that holds up to fifty 1.47MB black-and-white images at a time (and costs about \$8,000.)

"That's neat," said Walt. "Where's the film?"

Of course, there was no film.

"No film?" said Walt. "Where's the picture then?"

A look of childlike awe and wonder had transfigured his ultramature features. I heard the camera collecting images and I rejoiced. This was going better than I could ever have hoped! Walt was into the technology! The technology was acquiring him! Time passed. The shutter whirled. Walt was captured.

"Now what happens?" he said, rubbing his hands together in anticipation as Dugan attached a short, thick cable to the back of the camera and started to download

images into her laptop, a fast 486 ThinkPad loaded with Adobe Photoshop and enough communications gear to manage a lunar module.

"Now we see some of your shots here," she said, clicking the mouse a couple of times.

"What?" said Walt. "You mean . . . right now?"

A dozen shots of Walt popped up on the ThinkPad's excellent screen.

"Cool," said Walt. I'd never heard him use the word before. It was kind of like hearing Alan Greenspan, chairman of the Federal Reserve, call someone "dude."

Dugan was working on the image she liked best now, one of Walt, animated and charming, gesturing expansively with one hand. She was cleaning it up with the paint program, removing a stray hair, improving

lighting and skin tone, sharpening up the contrast a little.

"That's incredible!" said Walt. "Can I try?"

"Sure," said Dugan, saving the image. She shot a few rolls of real film while Walt, entranced, removed all the hair from the top of his head and gave himself a truly massive moustache and goatee.

"I gotta get me one of these!" he exclaimed not once but several times.

After a while, we had to take the toy away from him, but he didn't mind too much.

"I gotta get me one of these!" he said as we removed the laptop from his grasp.

**Back to the future of photography.** "I'll have prints back on these by this afternoon," said Dugan, plugging in to the wall and modeming the entire shoot back to her studio, where a Sony digital color dye-sublimation printer was waiting to print out the proofs.

And sure enough, that very afternoon, here came

**Time passed. The shutter whirled. Walt was captured.**

Walt's finished photos. The black-and-white prints were deep, lustrous, almost creamy. The slightly digital feel of the images gave them a downtown feel that fit in quite nicely with the cutting-edge, here-and-now message of our annual report.

"You like 'em?" I asked my boss.

"I suppose," he said, "although I still like my regular headshot better, you know, the one that was taken . . ."

"Twenty years ago?"

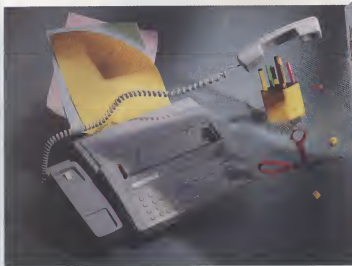
"Yeah," he said wistfully, staring at the digital image in his hand. "But we've got to move on sometime, don't we. I guess this'll do."

Amen. Hey, if technology can do its part to ease the inexorable passing of time, I guess it's done its job. ■





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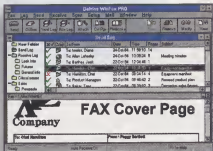
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# PENNYWISE PENTIUMS

**F**orget 66MHz 486 PCs—they're yesterday's news. If you're looking for processing power and multimedia muscle, you need a Pentium. But wait, you say. Who can afford one of these mainframes-on-a-desk? The answer is simple—you can. Fully stuffed local-bus Pentium PCs, complete with dual-speed CD-ROM drives, 16-bit sound cards, mega-sized hard disks, 17-inch monitors, and top-of-the-line graphics accelerators **BY PRESTON GRALLA** can be had for less than \$4,500 (although machines like Dell Computer's EISA-based OmniPlex 566 will still set you back nearly \$7,000).

While a Pentium generally costs more than a 486—anywhere from \$100 to \$2,000 more, depending on the manufacturer—you'll find that the extra cash is

## In This Feature

### OUR TOP PENTIUM PICKS 107

*Use our decision maker to choose the Pentium that matches your work.*

### SPEED DEMONS 108

*Even the slowest Pentiums are screamers. Results from our lab tests.*

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*A hands-on look at nine of the first multimedia Pentiums.*

### THE 32-BIT PCI ADVANTAGE 111

*PCI local bus debuts in many of the systems we tested. Here's how it works.*

money well spent. Pentium PCs make even 66MHz 486DX2s seem like laggards. Dell's OmniPlex 566, this roundup's standout performer, blazed through our Windows application tests a full 110 percent faster than a 66MHz 486DX2. Even the slowest Pentium, Insight Direct's PCI P60 MM, was 56 percent speedier than a 66MHz 486DX2.

When you buy a Pentium PC, don't settle for



Six months ago, a bare-bones Pentium set you back **\$9,000**. Today, you can get high-resolution local-bus graphics, superb 16-bit sound, a 17-inch monitor, and full Pentium power for **\$4,500**





anything less than 16MB of RAM, a 400MB or larger hard drive, and a high-resolution local-bus graphics card with 1MB of memory (2MB is preferable). A brand-new 32-bit version of Windows, Windows 4.0, is headed for your PC by early next year—along with a raft of other object-oriented operating systems—and you'll need all the processing power and disk space you can get. A 17-inch high-resolution monitor is also essential; we asked that all of the systems we received for testing include one. It's the best way to get the most out of Windows and other graphical operating environments.

A dual-speed CD-ROM drive and 16-bit sound card are also essential. Don't try to save a few dollars by buying a system that doesn't have multimedia: These capabilities are no longer a luxury; they've become a necessity. Sound, video, and CD-ROM technology are now essential requirements for today's cutting-edge software. You want to be sure your multimedia components are up to snuff, or you'll find your incredibly fast PC hamstrung by outdated hardware. The 486 system we used as a baseline

for the speed and cost comparisons in this story was fully stocked—with a 17-inch monitor, 16-bit sound card, and CD-ROM drive. Its cost came to \$4,356—more expensive than the stocked Zeos Pentium shown below.

## SPEED DEMONS

To find the best deals in multimedia Pentium PCs, we put nine systems through their paces: Advanced Logic Research's Evolution V ST/60, Austin Direct's Power System 60, Axix Computer's Ace Cache 586-66V/MPC, Dell's OmniPlex 566, Gateway 2000's P5-66, Insight Direct's PCI P60 MM, Polywell Computers' Poly 586-66VM, Tri-Star Computer's Tri-CAD P-5 PCI Station, and Zeos International's Pantera-66. We put each through a grueling series of tests to determine overall computing power, CD-ROM performance, and sound quality.

The verdict? If money is no object, then there's no doubt which to buy: Dell's OmniPlex 566. This 66MHz Peripheral Component Interconnect-based machine was not only the fastest one we tested, its speakers and sound card delivered the best sound quality, and its CD-ROM performance was first-class. But speed costs—the model we tested carries a price tag of \$6,995. The Poly 586-66VM, in a virtual tie with the Pantera-66 as the second-fastest performer, is much easier on the checkbook at \$4,885. But the quality of the Poly 586-66VM's sound was the worst we tested (as one tester stated, its speaker "sounds like an anemic weight lifter moving an ox,") and its CD-ROM performance was only so-so.

By contrast, the sleek Zeos Pantera-66 is a bargain-hunter's dream: At \$4,143, it is one of the least-expensive Pentiums we tested. It was also the third fastest, thanks to a fast hard drive and graphics accelerator based on Weitek's excellent P9000 chip. Zeos also ships the Pantera-66 with Windows for Workgroups—a bonus because with it installed, the Pantera-66 ran Windows applications 18 percent faster than with just Windows 3.1, and it offers full 32-bit file and disk access. Unfortunately, its sound card and speakers were a disappointment, although still better than the Poly 586-66VM. Never mind, we'll take it for its impressive speed and affordable price.

Also impressive was ALR's Evolution V ST/60. Although somewhat pricey at \$5,463, it held its own in performance tests. Axix's Ace Cache 586-66V/MPC, which ranked right behind the Evolution V ST/60 in performance, costs \$4,998 and had excellent sound quality—the second-best of the group. It was also the only entry to feature a triple-speed CD-ROM drive from NEC.

It should come as no surprise that the fastest Pentiums ran at 66MHz instead of 60MHz. The three fastest machines—the OmniPlex 566, Poly 586-66VM, and Pantera-66—all run at



### ZEOS PANTERA-66

**Fast and affordable, our favorite combo.**

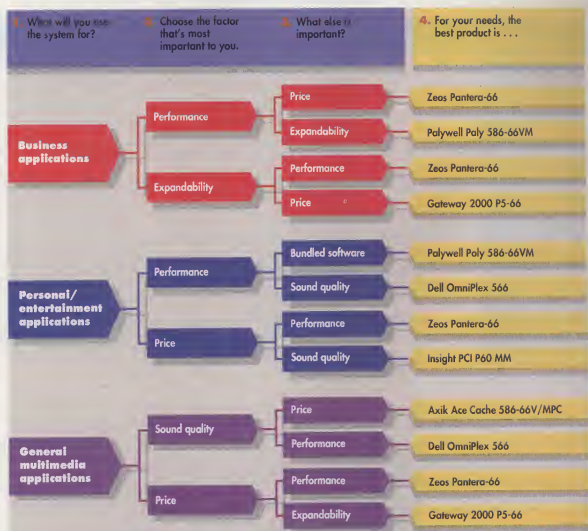
If you're looking for the right blend of power, all-around performance, and price in a multimedia Pentium PC, then there's no doubt which machine you should choose: Zeos's Pantera-66. This Pentium machine features scorching performance, loads of room for expansion, and little extras such as onboard business audio. Yet at \$4,143 (17-inch monitor included!), it's one of the most affordable Pentiums you can buy.

**Pantera-66 • \$4,143 • Zeos Int'l • 1301 Industrial Blvd. NE, Minneapolis, MN 55413 • (800) 554-5218, (612) 633-4591  
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## PC/COMPUTING DECISION MAKER

Which multimedia PC is right for your business?



that speed. One exception was ALR's Evolution V ST/60. It runs at 60MHz, yet was the fourth-fastest machine we tested, thanks in large part to its brawny Matrox MGA II graphics accelerator.

### UNDER THE HOOD

As for which local bus to choose when buying a Pentium, the debate over Intel's PCI bus vs. VESA local bus (VL-Bus) rages on. Six of our nine machines include PCI, while the other three incorporate VL-Bus technology. Dell's OmniPlex 566, our top performer, has a PCI bus, but the runner-up, Polywell's Poly 586-66VM uses the older VL-Bus design. It's still too early to tell which local bus has the performance edge, although both deliver the wider, faster data path that multimedia demands. PCI seems to be gaining ground on VL-Bus in industry acceptance—at least in Pentium-based systems. But, for now,

both standards have a steady following, and peripherals for both architectures are plentiful. Stay tuned.

The weak link in many of these machines proved to be sound quality. It's remarkable to think that you could spend several thousand dollars to put the equivalent of a mainframe on your desk and still get stuck with chintzy components, but it can happen if you're not careful. The sound quality of the Poly 586-66VM's Quick Shot speakers was roundly derided by virtually everyone who heard it. Of course, you don't want to spend \$1,000 extra for quality sound, because you get a built-in sound card and speakers into whatever Pentium you buy for much less.

In the end, the biggest lesson of this generation of multimedia systems is that Pentium PCs are quickly catching 66MHz 486DX2 systems as the platform of choice—even for those on a budget. At twice the performance for only a few hundred dollars more, who can resist?



## Why They're So Fast

Caching drive controllers and ultrafast video cards are key.

	ALR Evolution V ST/60	Austin Direct Power System 60	Axix Ace Cache 586-66V/MPC	Dell OmniPlex 566
Price (as configured)	\$5,463	\$4,295	\$4,998	\$6,995
Pentium CPU	60MHz	60MHz	66MHz	66MHz
External CPU cache	256K	256K	512K	256K
Upgradable CPU	○	○	○	●
Memory (installed/maximum)	16MB/128MB	16MB/128MB	16MB/128MB	32MB/192MB
Hard drive (installed/maximum)	420MB/1.37GB	525MB/525MB	525MB/1.7GB	535MB/2GB
Hard drive controller	IDE, 1MB cache	IDE	IDE, 4MB cache	PCI SCSI-2
Local bus	VL-Bus	PCI	VL-Bus	PCI
Video card	Matrox MGA II	Diamond Viper	Diamond Viper	ATI
Maximum video resolution at 72Hz	1,280 by 1,024	1,280 by 1,024	1,024 by 768	1,024 by 768
Warranty	5 years parts, 15 months labor	2 years parts and labor	1 year parts and labor	1 year parts and labor

● Yes ○ No

## THINK CD DRIVES ARE ALL ALIKE? THINK AGAIN

CD-ROM performance varied widely.

For reading large color Kodak Photo CD image files, the differences in the systems' CD-ROM drive performance were not dramatic. For searching and retrieving small bits of data on a disc, however, the drives in the Pentium systems from Austin, Axix, and Dell proved tops.

### CD-ROM Photo CD Performance

Tri-Star Tri-CAD P-5 PCI Station	32% Faster
Insight Direct PCI P60 MM	29% Faster
Austin Direct Power System 60	26% Faster
Axix Ace Cache 586-66V/MPC	26% Faster
Dell OmniPlex 566	23% Faster
Zeos Pantera-66	20% Faster
ALR Evolution V ST/60	15% Faster
Polywell Poly 586-66VM	15% Faster
Gateway 2000 P5-66	Baseline

### CD-ROM Seek Performance

Austin Direct Power System 60	156% Faster
Axix Ace Cache 586-66V/MPC	154% Faster
Dell OmniPlex 566	149% Faster
ALR Evolution V ST/60	125% Faster
Tri-Star Tri-CAD P-5 PCI Station	100% Faster
Insight Direct PCI P60 MM	60% Faster
Polywell Poly 586-66VM	41% Faster
Gateway 2000 P5-66	16% Faster
Zeos Pantera 66	Baseline

Better

Better



Gateway 2000 P5-66	Insight Direct PCI P60 MM	Polywell Poly 586-66VM	Tri-Star Tri-CAD P-5 PCI Station	Zeos Pantera-66
\$3,995	\$4,549	\$4,885	\$4,155	\$4,143
66MHz	60MHz	66MHz	60MHz	66MHz
256K	256K	512K	256K	256K
•	•	•	•	•
16MB/128MB	16MB/128MB	16MB/128MB	16MB/128MB	16MB/192MB
540MB/540MB	525MB/4GB	420MB/3GB	540MB/6GB	528MB/2GB
PCI IDE	PCI IDE	IDE, 4MB cache	IDE	PCI IDE
PCI	PCI	VL-Bus	PCI	PCI
ATI	ATI	Diamond Viper	Matrox MGA	Diamond Viper
1,280 by 1,024	1,024 by 768	1,280 by 1,024	1,024 by 768	1,024 by 768
1 year parts and labor	1 year parts and labor	2 years parts, 5 years labor	2 years parts and labor	1 year parts and labor

**B E S T**

## EVEN SLOW PENTIUMS FLY

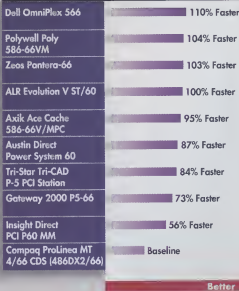
*All our Pentiums outpaced a 486DX2/66.*

All Pentiums are scorchers. Even the slowest system we tested was 56 percent faster running Windows applications than a comparably configured Compaq ProLinea MT 4/66 CDS 66MHz 486DX2. Dell's OmniPlex 566 was the hands-down performance champ—thanks in large part to its EISA system bus, 32MB of RAM (compared to the 16MB offered by competitors), and speedy hard drive—followed closely by Polywell's Poly 586-66VM and our favorite, Zeos's Pantera-66.

As you might expect, systems based on a 66MHz Pentium chip were generally faster than those that use the 60MHz variety. The exception: ALR's Evolution V ST/60. Using Matrox's 64-bit MGA II graphics accelerator, it easily outran several 66MHz systems.

The jury is still out on the PCI vs. VL-Bus debate. Our performance tests delivered no conclusive results on which design is faster. Dell's OmniPlex 566, the top performer, is a PCI system, but the runner-up, Polywell's 586-66VM uses VL-Bus, as do the Axix and ALR entries.

### Winstone Performance



Note: Winstone is a system-level benchmark that runs 12 of the most popular Windows business applications and delivers a single score based on their combined performance.



## ALR Evolution V ST/60

## Mighty 60MHz Power—At a Price

**Performance:** Although it runs at only 60MHz, the Evolution was the fourth-fastest system we tested.

**Sound quality:** Disappointing. Our sound tests jurors voted it among the worst, denouncing its sound quality as "thin" with a "flat, narrow range."

**Expandability:** There's a moderate bit of room to grow here. The Evolution has a total of six drive bays; two of which were available on our test unit. One VL-Bus slot and four ISA cards are also open for expansion.

**Price:** At \$5,463, it's one of the more expensive systems we tested.

**Bundled applications:** Just the basics, Microsoft's MS-DOS 6.2 and Windows 3.1.

**The lowdown:** ALR's Evolution is a solid machine with better-than-average Pentium performance. We just wish it wore a smaller price tag.

Rock-solid construction, a handsome case with nice attention to detail, excellent performance... these are just a few of the points that spring to mind when describing the Evolution V ST/60. This is a Pentium machine that's built to last.

The Evolution's CD-ROM drive is a solid performer as well. One notable problem: While maintaining a data transfer rate of 300Kps, it gobbled up 62.1 percent of the CPU's resources. And don't plan on playing your music CDs out loud with the Evolution, either; our judges were not impressed with its sound quality, probably due to the inexpensive Labtec CS-550 speakers that came with it. The 17-inch

## Winstone Performance

ALR Evolution V ST/60 100% Faster at \$5,463

Compaq ProLinea MT 4/66 CDS (486DX2/66) Baseline at \$4,356

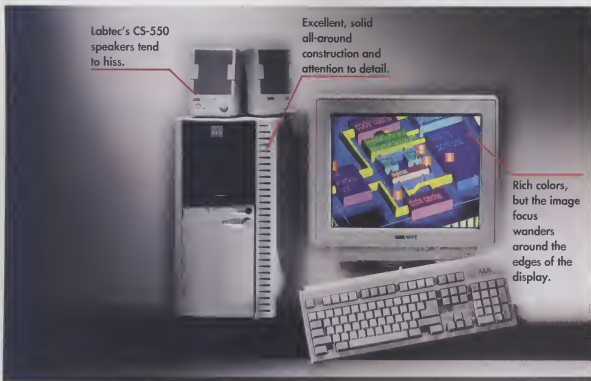
Better

Twice as fast as a comparably equipped 66MHz 486DX2—and the fastest 60MHz Pentium we tested.

FlexView 4XNI monitor produced an impressively rich color mix, although the image focus suffered around the edges of the display.

You won't go wrong with the Evolution V ST/60. But although it's a solid performer, you can get more Pentium power for less than its steep sticker price.

**Evolution V ST/60** • \$5,463 • Advanced Logic Research • 9401 Jeronimo, Irvine, CA 92718 • (800) 444-4257, (714) 581-6770  
Circle No. 671 on Reader Service Card





## The 32-Bit PCI Advantage

*Peripherals catch the express lane to the CPU.*

Peripheral Component Interconnect (PCI), Intel's local-bus standard, debuts in many of the Pentium systems we tested. Like VESA's local-bus standard (VL-Bus), PCI offers many benefits over the traditional ISA system bus, the data highway that connects a PC's peripherals to its CPU.

### ISA LIMITATIONS

#### **Slow, 16-bit data path.**

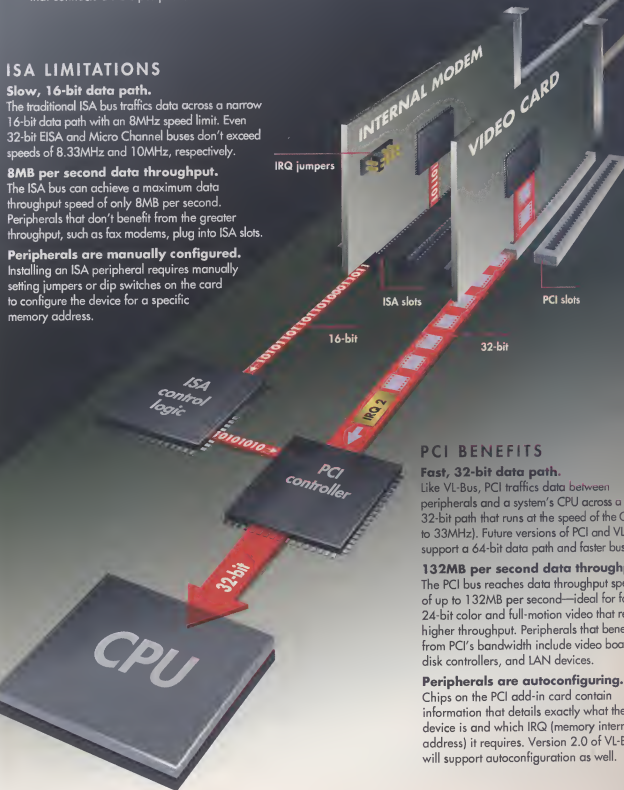
The traditional ISA bus traffics data across a narrow 16-bit data path with an 8MHz speed limit. Even 32-bit EISA and Micro Channel buses don't exceed speeds of 8.33MHz and 10MHz, respectively.

#### **8MB per second data throughput.**

The ISA bus can achieve a maximum data throughput speed of only 8MB per second. Peripherals that don't benefit from the greater throughput, such as fax modems, plug into ISA slots.

#### **Peripherals are manually configured.**

Installing an ISA peripheral requires manually setting jumpers or dip switches on the card to configure the device for a specific memory address.



### PCI BENEFITS

#### **Fast, 32-bit data path.**

Like VL-Bus, PCI traffics data between peripherals and a system's CPU across a wide 32-bit path that runs at the speed of the CPU (up to 33MHz). Future versions of PCI and VL-Bus will support a 64-bit data path and faster bus speeds.

#### **132MB per second data throughput.**

The PCI bus reaches data throughput speeds of up to 132MB per second—ideal for fast 24-bit color and full-motion video that require higher throughput. Peripherals that benefit from PCI's bandwidth include video boards, disk controllers, and LAN devices.

#### **Peripherals are autoconfiguring.**

Chips on the PCI add-in card contain information that details exactly what the device is and which IRQ (memory interrupt address) it requires. Version 2.0 of VL-Bus will support autoconfiguration as well.





Say this is an important document.

You could find it in a file in  
10 minutes. Maybe.

Locate the pictures, video  
and other pieces that go with it in  
an hour or two, with luck.

Route it to everyone who needs it in  
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document and work management  
software from IBM.

And be done with the whole thing by now.







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## Austin Direct Power System 60

# Right Price, but It's No Speed Champ

**Performance:** Middle of the pack.

**Sound quality:** Unimpressive. In our audio jury, one person remarked: "Like Greek coffee—muddy at the bottom."

**Expandability:** Not much room to grow: One internal and one external drive bay free; one PCI and three ISA slots available.

**Price:** At \$4,295 this was one of the least expensive systems we tested.

**Bundled applications:** MS-DOS 6.2, Windows 3.1, plus two Lotus applications of your choice.

**The lowdown:** If you're looking to save a buck, you might consider this machine. However, its performance lagged compared to some of the other Pentiums in its class.

Probably the best thing about the Power System 60 is its price: At \$4,295, it gives even those on a budget a chance to own a Pentium PC. The second-best thing is the monitor:

It produced extremely crisp, sharp images, and an LED readout on the front provides pertinent information such as the current resolution and refresh rate. The monitor is also EPA Energy Star-compliant and will go into a power-saving mode when it is left idle for a specified amount of time.

Unfortunately, that's where the good news ends. It's not that there's anything especially wrong with the Power System 60, except that it offers only midlevel performance (it was the fourth-slowest Pentium system we tested) and poor sound. While its Toshiba CD-ROM drive performed quite well in our seek tests, it had to use 56.4 percent of the CPU's

resources when transferring data at 300K per second. It's also not one of the more expandable Pentiums PCs we've looked at; there are only two additional drive bays and the processor isn't upgradable to future Pentium chips. In short, the machine won't set you back as much as many of the others—but you won't get as much performance, either.

**Power System 60** • \$4,295 • Austin Direct • 10300 Metric Blvd., Austin, TX 78758 • (800) 752-1577, (512) 339-3500  
Circle No. 672 on Reader Service Card

## Winstone Performance

Austin Direct  
Power System 60

Compaq ProLinea MT  
4/66 CDS (486DX2/66)

87% Faster at \$4,295

Baseline at \$4,356

Better

The Power System 60 is faster than a comparable 66MHz 486DX2—for about the same price.

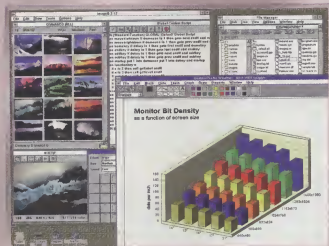
This power-saving monitor features a "sleep mode" to cut electricity bills.

MediaMagic's DSP-16 Plus sound card and Labtec's CS-550 speakers produce scratchy sound.

Performance is middling far a Pentium, despite the speedy Diamond Viper PCI graphics card.



# Awesome monitor. Killer price.



VisionMaster 17"  
ONLY  
**\$799**  
MSRP

Three "plus" year warranty. 1280 x 1024 at 80 Hz. EnergyStar. Only VisionMaster packs \$1,395 worth of performance into a \$799 monitor.

This is a monitor to write home about. Every high-performance feature at an unheard of price—backed by the most aggressive warranty in the business. The new VisionMaster 17" FST.

It's all here. Precision .26 dot pitch and incredibly fast 80 Hz vertical refresh for crystal clear, flicker-free images. Microprocessor control to eliminate image distortion. An anti-glare coating to relieve eye strain. A base three year warranty that can be extended to five years. MPR II low-radiation certification. And a unique "power-off" energy conservation system that makes any PC that uses it EnergyStar compliant.

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Fax: 215-957-6551



\*Three year warranty on parts and labor when purchased through an authorized reseller. Windows is a registered trademark of Microsoft Corporation. VisionMaster is a trademark and product of Iiyama North America. ©1994 Iiyama North America

Circle 179 on reader service card.

## No monitor beats the 17" VisionMaster

	VISIONMASTER MF-8617	VIEWSONIC 17	VIEWSONIC 17G	NEC 5FGE	NEC 5FGP
SCREEN SIZE	17" FST	17" FST	17" FST	17" FST	17" FST
DOT PITCH	.26mm	.28mm	.28mm	.28mm	.28mm
MAX RESOLUTION	1280 x 1024	1280 x 1024	1280 x 1024	1024 x 768	1280 x 1024
MAX. REFRESH @ 1280 x 1024	80Hz	76Hz	60Hz	N/A	76Hz
COLOR MATCHING	YES	YES	YES	NO	YES
POWER SAVING	YES	NO	YES	NO	YES
WARRANTY PARTS/LABOR	3YRS/3YRS	3YRS/1YR	3YRS/1YR	3YRS/3YRS	3YRS/3YRS
EXTENDED WARRANTY	YES 2 YEARS	NO	NO	NO	NO
PRICE	\$799	\$1199	\$999	\$1155	\$1455



Axik Ace Cache 586-66V/MPC

## A Slick Multimedia Ensemble

**Performance:** The Axik clocked in at the middle of the pack—95 percent faster than a 66MHz 486DX2.

**Sound quality:** Crystal clear. The combination of Creative Labs' Sound Blaster 16 SCSI-2 with ASP sound card and Sony's SRS-58PC speakers produced excellent sound—the second-best of the Pentiums tested.

**Expandability:** Lots of elbow room. Axik's full-tower design holds four 5½-inch drive bays (two internal, two external) and one 3½-inch internal bay. Three ISA slots and one VL-Bus slot are also available.

**Price:** At \$4,998, it costs a bit more than average.

**Bundled applications:** MS-DOS 6.2 and Windows 3.1.

**The lowdown:** This is an excellent system for multimedia mavens. It features extremely nice sound and a triple-speed CD-ROM drive.

As a multimedia Pentium system, Axik's Ace Cache 586-66V/MPC puts the accent on multimedia. Its Sound Blaster 16 SCSI-2 with ASP sound card and Sony speakers give a rich sound, and the triple-speed CD-ROM drive from NEC is fast enough to spin even the most demanding discs. For running Windows applications, its performance was average (for a Pentium) and it proved 95 percent faster than a comparably configured 66MHz 486DX2. It was one of two machines to include a 512K external CPU cache and one of three to incorporate VESA's VL-Bus, local-bus design.

Marring an otherwise well-crafted unit was the lackluster image quality

on the 17-inch display. In addition, the CPU isn't upgradable to future Pentium processor designs—that's not a serious liability but it is something to consider when making a purchase decision. In all other respects, however, the Ace Cache 586V/MPC is an impressive multimedia machine.

**Axik Ace Cache 586-66V/MPC • \$4,998 •**  
Axik Computer • 268 Santa Ana Court,  
Sunnyvale, CA 94086 • (800) 234-2945,  
(408) 735-1234  
Circle No. 673 on Reader Service Card

### Winstone Performance

Axik Ace Cache  
586-66V/MPC

95% Faster at \$4,998

Compaq ProLinea MT  
4/66 CDS (486DX2/66)

Baseline at \$4,356

Better

It's slow for a Pentium, but we'll buy the Ace Cache for its triple-speed CD-ROM drive and superb sound.

Impressive  
triple-speed  
NEC CDR-510  
CD-ROM drive.

Music to our ears, thanks to Sony  
speakers and a Sound Blaster  
sound card.

Drab colors and  
focus problems mar  
an otherwise fine  
multimedia system.



# Hayes Delivers The New Standard For High-Speed Global Communications.

**"FASTEST  
PERFORMANCE"**

\*PCWEEK Labs Testing



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Introducing the Hayes® OPTIMA™ 288 V.FC™ + FAX. An incredibly advanced modem that incorporates the

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## Dell OmniPlex 566

## Rocket Fast—And Sweet Sound, Too

**Performance:** Scarchingly fast. A full 110 percent faster than a 486DX2/66 in our Windows application tests thanks to a 66MHz Pentium chip, 32MB of RAM, and an EISA system bus.

**Sound quality:** Again, Dell bests the rest. Said one judge of the music from Creative Labs' Sound Blaster 16 sound card and Peavey's speakers: "You could hear the violin strings vibrate."

**Expandability:** Tight. With only two free PCI expansion slots inside, this is not the machine you want if expandability is a priority.

**Price:** Big bucks. It's the most expensive Pentium we tested at \$6,995. You get a great display and great sound, though.

**Bundled applications:** MS-DOS 6.2 and Windows 3.1.

**The lowdown:** Two wards sum up the OmniPlex 566: Swift and expensive.

Dell's OmniPlex 566 proves one thing: There are still some advantages to paying more for Pentium power. Yes, it's fast. Yes, the sound quality is superb. And yes, you'll have to dig deep into your pockets to afford it.

The OmniPlex 566 has a solid, compact design. Inside the case you'll find everything easily accessible, including its fast SCSI-2 disk controller and upgradable CPU. Dell shipped its system to us with 82MB of memory onboard—16MB more than all the other systems. It was also the only EISA system we tested.

Dell's UltraScan 17ES monitor is one of the best, with sharp focus and

good color quality. However, we ran into a bit of trouble with its Toshiba CD-ROM drive when running some applications: We were unable to read dual-session Photo CDs. Dell says

## Winstone Performance

Dell OmniPlex 566

110% Faster at \$6,995

Compaq ProLinea MT  
4/66 CDS (486DX2/66)

Baseline at \$4,356

Better

The fastest Pentium we tested and the only system with EISA and a SCSI-2 hard drive. But can you afford \$6,995?

new drivers will take care of the problem, and they'll be shipping by the time you read this.

**OmniPlex 566 • \$6,995 • Dell Computer Corp. • 9505 Arboretum Blvd., Austin, TX 78759 • (800) 289-3355, (512) 338-4400**  
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# cheap and fast

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Circle 243 on reader service card.





## Gateway 2000 P5-66

## A Bargain by Any Measure

**Performance:** Sluggish at best. The P5-66 clocked in as the second-slowest performer in our Windows application tests, running 73 percent faster than a 66MHz 486DX2.

**Sound quality:** An Aztech-designed sound card and Yamaha's YST-M10 speakers produced better than average sound.

**Expandability:** The P5-66's roomy tower design provides plenty of space to add components.

**Price:** You can't get any lower. At \$3,995, it's the least expensive Pentium in this roundup.

**Bundled applications:** Gateway offers a nice selection: MS-DOS 6.2, Windows for Workgroups 3.11, and a choice of application software.

**The lowdown:** It's a mixed bag: the most inexpensive entry we tested and the most expandable. If performance is a priority, however, you can do better.

Bargain hunters have long shopped Gateway 2000, and we expect that this unit will continue to bring the company good business: After all, who can turn down a full-featured multimedia Pentium system with a price tag of less than \$4,000?

There is a lot to like about Gateway's system besides its price. It offers plenty of room for expansion (even the CPU is upgradable) and very good sound quality. But while its Gateway CrystalScan monitor is sharp and crisp, we initially ran into some trouble configuring the system's video drivers to our liking. Likewise, we had some problems running a few multimedia

## Winstone Performance

Gateway 2000 P5-66 73% Faster at \$3,995

Compaq ProLinea MT 4/66 CDS (486DX2/66) Baseline at \$4,356

Better

It's faster than a 66MHz 486DX2 but sluggish by Pentium standards. The P5-66's real forte is its price.

applications because its sound card uses the same software addresses as Video for Windows.

The biggest drawback to the P5-66, however, is its performance. It was the second-slowest Pentium tested, despite its 66MHz chip.

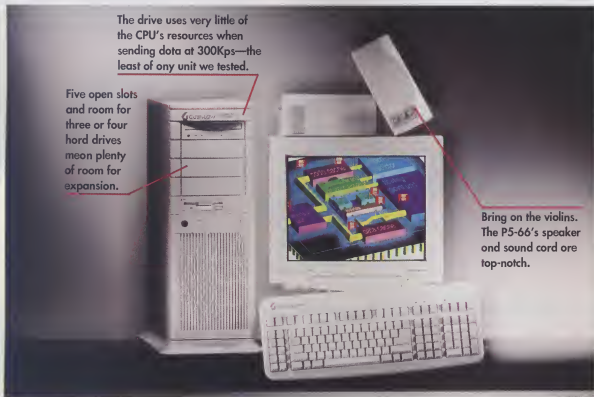
**P5-66 • \$3,995 • Gateway 2000 •**  
610 Gateway Dr., P.O. Box 2000, North  
Siaux City, SD 57049 • (800) 846-2000,  
(605) 232-2000

Circle No. 675 on Reader Service Card

The drive uses very little of the CPU's resources when sending data at 300Kps—the least of any unit we tested.

Five open slots and room for three or four hard drives mean plenty of room for expansion.

Bring on the violins. The P5-66's speaker and sound card are top-notch.







Create  
a powerful  
image with  
the right tools  
for the job.

**SAVE \$695<sup>SRP\*</sup>**

When you buy  
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**Aldus PhotoStyler 2.0. The leading  
image-editing software for Windows.**

PhotoStyler lets you easily access, edit, and prepare digital photos for placement in PageMaker. You'll be amazed at how simply you can scan, correct, retouch, manipulate, and crop photographic images with this powerful program. You can even combine different photos to craft something totally new (like we did in the photo above). And that's just for starters. Aldus PhotoStyler lets you add visual excitement to your publications. All by yourself.

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## Choosing a True Color Accelerator

It is no longer necessary to give up performance or high resolution to have rich photographic colors. Some valuable information to help you select a true color accelerator follows:

### Performance = 64+24

True color (referred to as 24-bit, or 16.7M colors) requires a graphics board to process three to four times more information than it would for 256 colors. Fast 64-bit graphics chips with complete hardware-assist functions for 24-bit acceleration are best suited for fast true color use. Some accelerators offer only 32-bit graphics engines or limited 24-bit color drawing functions. When comparing graphics performance, be sure to ask your vendor for results in true color mode, not just in 256-color mode.

### Don't Reboot Window

Conventional 2MB graphics cards force you to choose between high resolution graphics at 1280x1024 with only 256 colors or true color with only 800x600 resolution. Since you can't have high resolution mode for detailed text work and true color mode for rich photographic colors at the same time, you have to compromise.

To switch modes, conventional boards require you to leave the application and then restart Windows. This process is inconvenient and time consuming. Look for features like ATI's WinSwitch, which allows you to quickly and conveniently toggle between high resolution mode and true color mode using a simple keystroke without closing your applications or leaving Windows.

### VRAM Really Matters

Only VRAM memory guarantees stable performance in true color modes because of their dual port design. Most DRAM accelerators may look fast in 256-color mode, but will offer only a fraction of the performance of VRAM accelerators in true color mode. Avoid DRAM memory for serious true color work.

Watch for new helpful information.....

GRAPHICS AND MULTIMEDIA ACCELERATOR • GRAPHICS

# Attack of the Killer Pixels



There's millions of them, and they're moving fast to infest every PC with deadly precision and terrifying speed. The hordes of killer pixels from ATI's GRAPHICS PRO TURBO will turn your PC into an amazing hive of graphics activity.



### 64-Bit Stinger

Stirred up by our 64-bit *mach64* accelerator chip, the GRAPHICS PRO TURBO sends your applications swarming across the screen at fantastic velocities – over 100 million Winmarks\*. Work faster not harder, even in demanding high resolution, true color applications.



GRAPHICS PRO TURBO  
outperforms other accelerators.

GRAPHICS PRO TURBO is the ideal card for today's hot PC architectures. With up to 4MB of memory for 1280x1024 graphics in

16.7 million colors, VRAM ensures consistent performance across all display modes. And unlike a lot of other accelerators, the GRAPHICS PRO TURBO is frantically fast not just in Windows, but in DOS and other environments as well.

### True Killer Color

ATI's new strain of pixels is not only fast, it's vibrantly colored as well. GRAPHICS PRO TURBO gives you accelerated 24-bit true color that never



stops working, even at resolutions as high as 1280x1024. In fact, it runs in 16.7 million

colors as fast as other cards do in

just 256. Our exclusive software keeps all that color under control. Color calibration software provides a perfect match for graphic arts applications. Plus





# •105+ Million Winmarks<sup>†</sup> •1280x1024 in 16.7M colors

Introducing the

## GRAPHICS PRO TURBO™

our unique WinSwitch feature lets you change color and resolution modes to suit your applications, quickly and conveniently ... without restarting Windows.

### Vicious Video

As an added bonus, the GRAPHICS PRO TURBO is ready to make

motion video fly. With accelerated image scaling and enhanced pixel smoothing, it displays motion video with no additional multimedia hardware.

### COMPLETE PERFORMANCE DATA (Larger numbers are better)

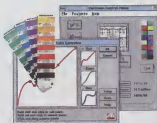
	GRAPHICS PRO TURBO	Maxx MGA II+	Diamond Viper
Winbench 3.11 1024x768 256 colors	36.2	28.0	20.0
Winbench 3.11 1024x768 65K colors	25.7	12.1	4.6
1024x768 256 colors	8,482	993	2,953
1024x768 65K colors	24	11	13

GRAPHICS PRO TURBO outperforms other accelerators.

### Wildier Windows

Windows users, get your screens up: GRAPHICS PRO TURBO is going to give you a real buzz. With acres of virtual desktop and a complete control panel, plus flicker-free graphics at up to 100 Hz refresh, the GRAPHICS PRO TURBO is absolutely the fastest, most convenient card for Windows.

*True Color + High Resolution  
WinSwitch changes color and resolution...without leaving Windows  
Desktop settings*



*Color calibration  
Easy control of desktop settings and color calibration with FlexDesk panel.*

### Bee The Best

Our high quality design ensures a perfectly clear picture ... no color bleeding or blurry images. And ATI's solid support, with regular no-bug software updates, will keep your system humming. So don't be stung by lesser graphics. Get the GRAPHICS PRO TURBO. It's a honey of a card.

### GRAPHICS PRO TURBO

- 2MB (upgradeable) or 4MB VRAM memory
- ISA, VESA and PCI Local Bus versions
- Dynamic monitor control and adjustment
- Drivers for OS/2, CAD, DOS and more
- Energy efficient, Green PC support
- 5 yr. warranty
- Priced\*\* at \$599 (2MB) and \$899 (4MB)



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**ATI**  
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Perfecting the PC

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Thornhill Ontario Canada L3T 7N6  
Telephone: (905) 882-2600 ext. 4222  
Facsimile: (905) 882-2620  
CompuServe: GO ATITECH  
76004,3656

\* All performance tests done on a Pentium 66MHz, 16MB RAM, 256K cache, 200MB HD at 60Hz, using 2MB versions of PCI graphics cards. † Winbench 3.11 at 1024x768 resolution in 256 colors  
†† VGA performance tested using PCIBench 7.01 (video harmonic) ††† Motion Video performance measured under Windows using 65K colors. Test clip recorded at 320x240 at 30 fps using Indeo code.

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## Insight Direct PCI P60 MM

## Expandable, Affordable, and Loaded

**Performance:** For a Pentium, this machine is s-l-o-w. Yes, it ran a full 56 percent faster than a 66MHz 486DX2, but it lagged behind every other Pentium we tested. **Sound quality:** Excellent. It tied for second place in our juried tests. **Expandability:** A warehouse. Eight free drive bays virtually guarantee you'll never run out of room. **Price:** A bargain. At \$4,549, this was one of the least expensive multimedia Pentiums we tested. **Bundled applications:** Fourteen CD-ROMs come with the system—primarily games, entertainment, and informational titles. MS-DOS 6.2 and Windows for Workgroups are included as well. **The lowdown:** Inexpensive, very expandable, and loaded with CD-ROM titles—in many ways it's the best deal around. There's only one problem: It's a slug.

If only Insight's PCI P60 MM were faster! It has great sound, lots of room for expansion, plus 14 bundled CD titles. The monitor's colors are rich, its focus sharp. CD-ROM performance was better than average—Insight's drive required the second-fewest CPU resources of any system we tested. Likewise, the combination of Reveal's Sound FX Pro sound card and Altec Lansing's ACS100 speakers give this machine excellent sound. There are also two ISA slots and one PCI slot available should you need to add peripherals. Unfortunately, the PCI P60 MM is pokey: Its Winstone scores were

the lowest of any machine tested. As much as we liked the system, its performance isn't up to snuff.

## Winstone Performance

Insight Direct  
PCI P60 MMCompaq ProLima MT  
4/66 CDS (486DX2/66)

56% Faster at \$4,549

Baseline at \$4,356

Better

The slowest Pentium of the bunch, Insight's PCI P60 MM emphasizes value over performance.

Although faster than a 66MHz 486DX2, it was the slowest Pentium in our Windows application tests. If speed is a priority, you'll want to look elsewhere.

**PCI P60 MM • \$4,549 • Insight Direct •**  
1912 W. Fourth St., Tempe, AZ, 85281 •  
(800) 859-5668, (602) 902-1135  
Circle No. 676 on Reader Service Card

Fourteen bundled CD-ROM titles make this a great entertainment system.

Sluggish performance is the only downside to an otherwise impressive machine.

Encore! Reveal's Sound FX Pro sound card and Altec Lansing's ACS100 speakers produce excellent sound.



# RUNNING WINDOWS WITHOUT NORTON DESKTOP? YOU PROBABLY SWIM AFTER A BIG MEAL AND THEN RUN AROUND THE POOL WITH SCISSORS, TOO.

Listen up, you risk-takers. What would your mother say if she saw you now?

No doubt she would tell you to go right out and get the new Norton Desktop 3.0 for Windows before you damage yourself.

Or your computer.

That's because NDW 3.0 not only enhances your work, it's also the safest way

to run Windows short of

tapping directly into Bill Gates' subconscious. Made by Peter Norton, it's packed full of utilities to provide a safer working environment.

Like our new Norton AntiVirus 3.0, which protects your system against over

2,800 known viruses, and our new Norton BackUp<sup>®</sup> 3.0 with enhanced support for SCSI drives. There's also the new UnErase, to recover accidentally erased files. Disk Doctor for automatic disk diagnosis and disk repair. And a Fix-It disk with a full collection of DOS utilities to recover and repair files or entire disks, even if you can't run Windows. And now for the first time, you'll be able to run Speed Disk under Windows to boost performance.

In addition, NDW 3.0 simplifies Windows for you by integrating file and program management. And while the new FileAssist will allow you to easily manage your files without having to leave your applications, the new Day Planner will allow you to easily manage your life. And who doesn't need a little help with that?

Plus, the new "push button" Control Center allows you to customize pull-down menus, icons, toolbars and a lot more to make sure that Windows looks and works exactly the way you want it to.

So the choice is yours. Either see your local dealer, call 1-800-628-4777, ext. 9312 to order, or live a life full of danger and recklessness, running Windows without Norton Desktop 3.0 for Windows and sprinting around pools with sharp objects until you finally put somebody's eye out.

Of course, you would be absolutely crazy not to pick up your own copy of NDW 3.0 today. And remember, don't run Windows without it!

**THE NORTON  
DESKTOP<sup>®</sup>**  
FOR WINDOWS  
**SYMANTEC<sup>™</sup>**

For information in Europe, call 01-71-363111. Australia, 01-3-679-6677. Canada, 1-800-667-8961. Elsewhere outside U.S., 408-253-4870. The Norton AntiVirus and Norton Disk Doctor are registered trademarks and Norton BackUp, Norton Desktop and Speed Disk are trademarks of Symantec Corporation. ©1994 Symantec Corporation. All rights reserved.

Circle 154 on reader service card.



## Polywell Poly 586-66VM

## Supercharged and Packed with Discs

**Performance:** Fast! That's the bottom line on this system. It clocked in at 104 percent faster than Compaq's 66MHz 486DX2 ProLinea, which put the Poly 586-66VM only a few percentage points behind Dell's front-running OmniPlex 566. Its CD performance wasn't stellar, though. **Sound quality:** Better not to ask. Our jury gave it the worst rating of all the Pentiums.

**Expandability:** Four internal and one external drive bays free means there's room to grow. **Price:** Average. At \$4,885, it fell into the middle range of our Pentiums. **Bundled applications:** Buy this machine and you get ten CD titles. MS-DOS 6.2 and Windows for Workgroups 3.11 are also included. **The lowdown:** It's lightning fast, reasonably priced, and includes lots of CD-ROM titles. Overall, a very good buy.

There's a lot to like in this Pentium system. The CPU is a rocket, although its CD performance won't knock your socks off. It's extremely expandable, comes with many bundled CDs (mainly games such as *Chessmaster 2100* and *Robocop 3-D*), and falls into the middle price range. The three free ISA slots and one free VL-Bus slot mean that you'll have room to put in a number of peripherals as well. And the machine's low-radiation monitor produced vivid colors and deep, rich hues.

In fact, there's only one primary drawback: the truly disappointing sound. The Pro Audio DSP sound card from Media Vision and

speakers from Quick Shot rated rock bottom in our juried audio tests. If you buy the Poly 586-66VM, figure on spending some money for a new pair of speakers.

If the machine cost a bit less and had nicer sound, we would have rated it at the top of the pack.

**Poly 586-66VM • \$4,885 • Polywell Computers • 1461 San Mateo Ave., South San Francisco, CA 94080 • (800) 999-1278, (415) 583-7222**  
**Circle No. 677 on Reader Service Card**

## Winstone Performance

Polywell Poly

586-66VM

Compaq ProLinea MT

4/66 CDS (486DX2/66)

104% Faster at \$4,885

Baseline at \$4,356

Better

Second only to Dell's OmniPlex 566 in our Windows application tests, Polywell's Poly 586-66VM is a great value.

Bundled CD-ROM titles make this a great entertainment system.

A rocket—the second-fastest Pentium we tested.

Nice hues, sharp focus.

Alas, its sound quality rated lowest overall.



BLACK HOLE (ARTIST'S CONCEPTION)

# "THIS MEETING WAS SUPPOSED TO START A HALF HOUR AGO. WHERE IS EVERYBODY?"

It's a known fact. Busy schedules and poor communication can create black

holes that suck up co-workers just before the big meeting. Scientists can tell us a lot about black

holes but they can't get people together on time. Only Organizer™ can do that.

Lotus® Organizer 1.1  
Personal Information Manager for Windows™ works across your existing ccMail® network to make pulling together that big meeting—as well as planning your day—easier than ever before. You simply choose attendees from

the ccMail directory. Organizer shows you a graphical view of their schedules so you can pick the best meeting time. Then Organizer delivers an invitation via ccMail. Invitees can accept, decline, or delegate to someone else with a single click. Organizer tracks them automatically. No phone tag. Just

the easiest way ever to plan a meeting.

Organizer's group scheduler displays a user's availability only, not the entire schedule, so everyone's

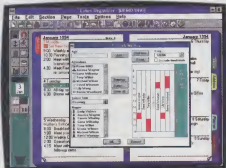
privacy is protected. And invitations can be sent to anyone on the ccMail

network even if they don't use Organizer.

Organizer does more than plan meetings. Organizer includes an on-screen calendar, an automated to-do list, an address book, a note pad and an anniversary reminder. Organizer will even sound an alarm to remind you of a commitment—like that meeting you're invited to.

There are three ways you can get Organizer: on its own; with ccMail in the 10-user Group Pack; or for an even better deal upgrade to SmartSuite®—a suite of five top-notch fully integrated business applications including Organizer—for just \$299.\* Call 1-800-872-3387, ext. 9471, or visit your Lotus Authorized Reseller. Because, as common as they are, black holes at work are now entirely preventable.

**Lotus**  
Working Together™



*Lotus Organizer with group scheduling takes the guesswork—and the footwork—out of meeting planning.*



## Tri-Star Tri-CAD P-5 PCI Station

# The Price Is Right, Performance Lags

**Performance:** At 84 percent faster than a 66MHz 486DX2, the Tri-CAD P-5 PCI Station was the third-slowest machine we tested, just behind Austin Direct's Power System 60.

**Sound quality:** Mixed reviews. Some judges liked the sound, calling it "deep," with a "nice range," while others thought it "a bit hollow," with "slight hissing."

**Expandability:** There's a moderate amount of room, enough for one 5½-inch and two 3½-inch drives.

**Price:** At \$4,155, it fell into the middle price range.

**Bundled applications:** Just the basics—MS-DOS 6.2 and Windows for Workgroups 3.11.

**The lowdown:** A fair performer with middling sound quality and a competitive price. Any way you look at it, this is a middle-of-the-pack machine.

In just about every way you can name, this Pentium sits in the middle of the pack. Its price is competitive; its expandability adequate. The Aztech Sound Galaxy sound card and Labtec CS-800 speakers produce middle-quality sound that ranked fifth of the bunch. The machine's performance scores, however, were among the lowest for Pentium systems in this category, despite its fast PCI-based Matrox MGA graphics card.

On the plus side, Tri-Star's system has a low-radiation monitor that produces crisp colors and sharp focus. The CD-ROM performance was also quite good, although it did give us trouble when

reading one of our test CDs, *Just Grandma and Me*. The CPU is upgradable should you decide to upgrade the 60MHz processor later. Its low price and generous two-year warranty merit consideration. There are faster machines than the Tri-CAD, but overall it's not a bad deal.

## Tri-CAD P-5 PCI Station • \$4,155 •

Tri-Star Computer • 120 S. Weber Dr., Chandler, AZ 85226 • (800) 488-7800, (602) 961-3401

Circle No. 678 on Reader Service Card

## Winstone Performance

Tri-Star Tri-CAD  
P-5 PCI Station

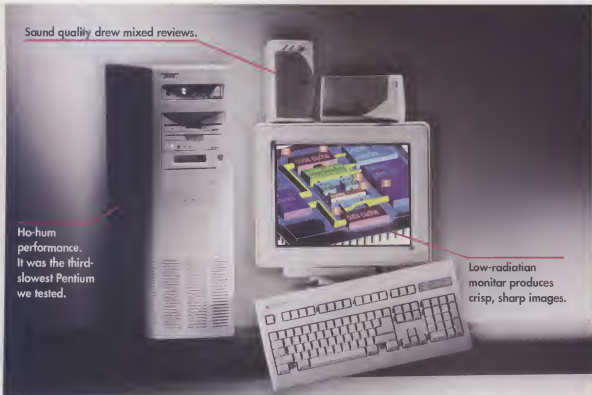
Compaq ProLinea MT  
4/66 CDs (486DX2/66)

84% Faster at \$4,155

Baseline at \$4,356

Beiter

It's faster than a comparably configured 66MHz 486DX2, but it lagged behind the other Pentiums.



Sound quality drew mixed reviews.

Ho-hum performance. It was the third-slowest Pentium we tested.

Low-radiation monitor produces crisp, sharp images.



# Speed Demon

STEALTH 64  
\$399  
2MB VRAM  
GRAPHICS ACCELERATOR

## 100+ Million WinMarks. No Sweat.

**Stealth 64 Graphics Accelerator**  
Hungry for speed? Then get the fastest. The power of Stealth 64 will make your graphics fly. Now the award-winning Stealth™ gets even better.



Stealth 64 builds on the award-winning Stealth Pro

### Record-Breaking Speed

Stealth 64 is the world's fastest graphics accelerator. Our competitors claim otherwise. The benchmarks tell the story.

- ◆ 100+ million WinMarks, WinBench 3.11
- ◆ 32+ million WinMarks, WinBench 4.0
- ◆ 64-bit graphics processor
- ◆ S3 Vision964 graphics controller
- ◆ Optimized drivers for Windows and AutoCAD
- ◆ PCI and VESA Local Bus



### Sharper Image

Max resolutions, max colors, and rack-solid refresh rates give you the best possible images on your monitor.

- ◆ 24-bit true color at 1024x768 with 4MB
- ◆ 1280x1024x65K colors with 4MB
- ◆ Up to 120Hz refresh rate
- ◆ 2MB VRAM upgradable to 4MB

### Ease of Use

Diamond's InCentral Tools™ software boosts your productivity.

- ◆ Virtual desktop: real-time pan and zoom
- ◆ Monitor frequency selection
- ◆ Custom cursor color and size
- ◆ Programmable keyboard and mouse hatkeys
- ◆ DPMS power savings

### No-Compromise Quality & Service

As with all Diamond graphics cards, Stealth 64 is backed by a five-year parts and labor warranty and phone-in technical assistance six days a week.

### Call for More Information

For more on the Stealth 64 or where to buy, call our fax-on-demand service at

**1-800-380-0030**



**DIAMOND**  
Computer Systems, Inc.

Accelerating In Graphics and Multimedia

Windows 3.1 performance tests performed by Diamond Computer Systems, Inc. using Ziff-Davis WinBench Versions 3.11 and 4.0 on an Intel Pentium-66 PCI system with 256K cache, 16MB RAM, 240MB IDE hard drive, SmartDrive 2048, and DOS 6.0. The Stealth 64 was configured with 2MB VRAM or 1024x768x256 colors/70Hz Large Font using driver release 1.00b. All trade names referenced are the service mark, trademark, or registered trademarks of the respective manufacturers. Diamond reserves the right to change specifications without notice. Copyright © 1994 Diamond Computer Systems, Inc. 1130 East Arques Avenue, Sunnyvale, CA 94086, 408-736-2000, Fax: 408-730-5750

Circle 186 on reader service card.



## Zeos Pantera-66

## A Standout in Speed and Value

**Performance:** A rocket. The Pantera-66 nearly tied with the Poly 586-66VM as the second-fastest Pentium tested—twice as fast as a 66MHz 486DX2. CD-ROM speed was less impressive, but possible. **Sound quality:** Tinny. One judge likened the sound to “a symphony in a sordine con.”

**Expandability:** There's plenty of room for expansion inside this full-tower case, with five internal and two external bays available.

**Price:** At \$4,143, this is a deal you simply can't pass up.

**Bundled applications:** MS-DOS 6.2, Windows for Workgroups 3.11, and two Lotus apps of your choice.

**The lowdown:** Hot performance, room for expansion, and a low price make this system our top choice.

If you're going to buy a multimedia Pentium system, we suggest you

spend your money on this machine—it offers the best value of any system we tested. This is a Pentium that just about anyone can afford.

The Pantera-66 ships with Windows for Workgroups 3.11—a bonus because you'll generally get faster performance running this version vs. plain-vanilla Windows. When we tested the Pantera-66 with Windows for Workgroups it actually outran the Dell's OmniPlex 566, which ships with Windows only.

The Pantera-66's monitor produces nice hues and sharp focus. Having onboard business audio with headphones and a microphone is a plus as well. The real drawback to

## Winstone Performance

Zeos Pantera-66

103% Faster at \$4,143

Compaq ProLinea MT  
4/66 CDS (486DX2/66)

Baseline at \$4,356

Better

Zeos's Pantera-66 is faster than a speeding 486DX2/66—and at a great price, too. We'll take it.

this machine is sound quality—the Labtec CS-550 speakers and Cardinal Technologies Digital Sound Pro 16 sound card drew low ratings from our audio jury. But with the Pantera-66's low price, you can replace both the sound card and the speakers and it's still a bargain.

**Pantera-66 • \$4,143 • Zeos Int'l • 1301 Industrial Blvd. NE, Minneapolis, MN 55413 • (800) 554-5218, (612) 633-4591**  
Circle No. 679 on Reader Service Card

Big tower case means lots of room for expansion.

Rocket-fast performance and a great price make this our favorite Pentium of the lot.

For serious sound you'll need better speakers.



# The New Pentiums: Loaded and Ready

*The power you crave at a price you can afford.*

**F**irst-generation multimedia Pentium PCs are out of the gate—and they cost less than you might expect.

Fully loaded with dual-speed CD-ROM drives, capacious hard drives, 16-bit sound cards, 16MB of RAM, and 17-inch monitors, they're the best one-stop multimedia solutions yet. Prices for some of the systems we tested dipped below \$4,500, making them some of the best bargains around—even for those on a budget. A few other questions these multimedia Pentiums answered:

**How much faster are Pentium systems than 66MHz 486DX2 systems?** Even slow Pentiums are rockets. In our application tests, Pentium systems outperformed a 66MHz 486DX2 by a wide margin—in some cases offering double the performance for only a slight price premium. Even the slowest Pentium we tested was 57 percent faster than a comparably configured 66MHz 486DX2. Dell's OmniPlex 566 proved fastest overall.

**Are Pentium PCs a better buy than 66MHz 486DX2s for those on a budget?** In most cases, yes. Zeos' Pentium system, for example, costs less than a comparably configured 66MHz 486DX2 from Compaq, yet offered double the performance in our tests. Of course, you can also spend \$6,000 or more for an EISA-based system like Dell's OmniPlex 566.

**Do you really need local bus?** Absolutely—especially for multimedia applications. VL-Bus and PCI peripherals can reach data throughput speeds of up to 132MB per second, essential for fast 24-bit color and full-motion video. Besides, virtually all Pentium systems now include some form of local bus onboard.

**PCI or VL-Bus—which local bus should you buy?** PCI was the most popular local-bus architecture of the systems we tested: six of the nine machines are designed around it. Dell's OmniPlex 566, the top performer, uses the PCI architecture, but the runner-up, Polywell's Poly 586-66VM, uses the older VL-Bus design. It's still too early to tell which bus will dominate—both deliver the wider, faster data path that multimedia demands. For now, either one is likely to suit most people's needs.

**What are the key pieces to a Pentium system?** Don't settle for anything less than 16MB of RAM, a 400MB or larger hard drive, and a high-resolution local-bus graphics card with 1MB of memory (2MB is preferable). A dual-speed CD-ROM drive and a 16-bit sound card are also essential. You'll need all of these things to keep pace with today's (and tomorrow's) most demanding applications. ■

## A LA CARTE OR FULLY STOCKED?

*Get the multimedia pieces you need when you buy your system.*

Don't try to save a few dollars on a system that doesn't have multimedia. Multimedia is now an essential part of today's cutting-edge software. We compared the price of an average multimedia Pentium with all the right pieces against a comparable system assembled à la carte. The verdict? Buying a fully loaded multimedia system will save you a bundle. All of the systems we tested for this story were multimedia-stocked.

Fully loaded	A la carte	
66MHz Pentium system	66MHz Pentium system	\$3,475
17-inch monitor	17-inch CTX monitor	\$720
16-bit sound card	Creative Labs Sound Blaster TXM 16	\$175
Dual-speed CD-ROM drive	Toshiba 3401 CD-ROM drive	\$480
Speakers	Altec ACS100 speakers	\$125
<b>Total cost:</b>	<b>\$4,500</b>	<b>Total cost: \$4,975</b>



# If you're switching from your moving crew

## Introducing the Borland® Office 2.0.



*The Borland Office 2.0 integrates PC/Computing's three Most Valuable Products. No other suite has even one.*

Moving to Windows™ can be easy. Especially if you have a lot of help. That's why the Borland Office 2.0 teams up the most award-winning products of all time. And it throws in some extra muscle, too.

### Help with DOS files.

Our Windows products have the best compatibility with your existing DOS files. So you don't have to leave anything behind. Plus, it's easier to work with other people who haven't moved to Windows. You can even switch back and forth between platforms if you want.

### Help learning.

Instead of learning new Windows programs, why not let them teach you? The Borland Office has "Coaches" to show you how things work. Plus it has "Experts" and "Macros" that will perform complex tasks for you. So you don't have to

learn anything at all.

Our Transition Advisor can even teach you the new key commands. Or if you prefer, we can make your WordPerfect® menus and commands exactly like DOS. Nothing to it.

### The best products.

Only the Borland Office gives you the three MVP products in the categories you want most—word processing, spreadsheets, and database.

**WordPerfect 6.0 for Windows.** More than just a word processor, it's a complete document processor with integrated text, data and graphics. And it directly imports more types of spreadsheets, graphics and even database information than any ordinary word processor.

**Borland Quattro® Pro 5.0 for Windows.** It's the easiest-to-use spreadsheet with the most analytical functions and graphical tools available. No wonder it's received more awards and recognition than any other spreadsheet. Ever.

**Borland Paradox® 4.5 for Windows.** It's the best-selling PC database. And with good reason. It features built-in SQL connections to all the popular database servers for instant, easy access to all your data.

### Help sharing.

Unlike other suites, every product in the Borland Office is workgroup-ready right out of the box. So you can share database information with your co-workers and insert their spreadsheets, automatically receiving updated data. The Workgroup Desktop makes distribution easy. And you don't have to buy any additional hardware or software.

### Help working.

Of course, the Borland Office keeps helping you after the move. The Desktop Application Director (DAD) makes it easy to switch between



*The Desktop Application Director (DAD) makes it easy to switch between applications and commonly-used tasks.*

applications. And PerfectFit Technology means that the programs share button bars, icons, cross-application macros, even resources like spell checking. So each product "looks and feels" the same.

### Call (800) 526-5069 for more information.

Call us today for product and ordering information. You'll get more than just software, you'll get a moving crew.



# From DOS to Windows, it has just arrived.

**WordPerfect 6.0**  
for Windows

**Borland Quattro Pro 5.0**  
for Windows

**Borland Paradox 4.5**  
for Windows







# DUELING DESKTOPS

*The battle for  
control of your  
Windows files and  
resources is down  
to two titans.  
We found one  
winner.*

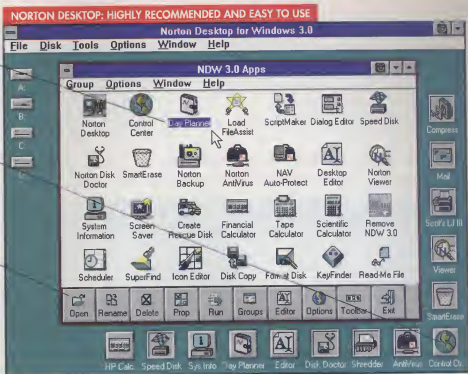
**BY SCOT FINNIE**

**M**aybe you've noticed: Windows just *ain't* what it used to be. Sure, it was the cat's meow back when it first emerged in May of 1990. But that was four long years ago—an eternity in PC years—and the grand old operating environment isn't beyond a little help. While Microsoft lumbers to the rescue with a major Windows upgrade expected next year, there's something you can do today: Install a freshly updated Windows desktop utility from either Central Point Software or Symantec. It's just what the doctor ordered.

Trouble is, getting used to one of these Program Manager replacements is about as appealing as undergoing a company-wide restructuring. There is the way you've always done things under Windows, and the new and different way you'll do them with a Windows desktop utility. But forget everything you've ever heard about Symantec's Norton Desktop for Windows and Central Point's PC Tools for Windows. This is a clean slate, a tabula rasa, a blank check. These products have wised up, straightened out, and become far more usable. They're actually leading the charge toward Windows' rejuvenated future.

The key to that future is *datacentricity*. Maybe you've read computer magazines that get all preachy about this buzzword. In our best Winston Churchill voice, we've proclaimed that it's the path to nirvana, the greatest thing since sliced bread, you get the idea. And all that's true. But what we're talking about when we hail the coming of datacentricity is operating





#### DAY PLANNER

This full-blown Windows personal information manager (PIM) has extensive drag-and-drop capabilities.

#### CONTROL CENTER

One of Norton Desktop's chief advantages is a graphical utility that manages configuration settings and preferences.

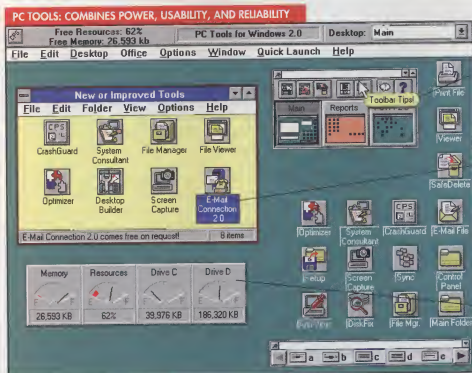
#### GROUP BOX TOOLBARS

PC Tools doesn't have these. Shown large here, you can make them smaller or show only text labels. And they're configurable.

NORTON DESKTOP 3.0

**VS**  
PC TOOLS 2.0

*The most popular Windows desktop utility just keeps getting better. It's a reliable, worthy choice.*



#### TOOLBAR TIPS

Like Microsoft's Word 6.0, PC Tools' toolbar buttons display helpful pop-up text labels.

#### E-MAIL CONNECTION 2.0

How do you counter Norton Desktop's full-blown Windows PIM? With Connect Software's E-Mail Connection 2.0, of course.

#### CRASHGUARD

CrashGuard keeps track of system resources and warns you if they're dangerously low. Norton Desktop doesn't have it.

*PC Tools comes of age with powerful new features and refinements available everywhere you turn.*





systems and applications that help you find that @!\$#?%&\*! file with the crucial figures your boss wants. Right now! While they're only a step in the right direction, Norton Desktop 3.0 for Windows and PC Tools 2.0 for Windows offer arrays of features that help you identify, locate, view, and open files.

What about civilizing Windows, making it a warm, safe

place to work? It's those little niceties—like system resource monitors, disk repair tools, antivirus utilities, virtual maps, backup programs, file viewers, text editors, disk defraggers, file undelete tools, and file compression utilities—that make all the difference in getting Windows 3.1 habitable. When you venture into the world of desktop shells, you'll find that Symantec and Central Point

Software give you gobs of this stuff.

OK, so you enjoy file management about as much as you enjoy spending an hour in a traffic jam. But when you do have to sit in traffic, would you rather be inside a Yugo or a limousine? That's about the magnitude of the difference between using Windows 3.1's skimpy File Manager and revving up the powerful file management tools in Norton Desktop and PC Tools.

Getting up to speed is at least half the battle in adopting a new Windows desktop package. And it's in usability that Norton Desktop 3.0 and PC Tools 2.0 have really leapt ahead. Both products now provide online tutorials and have streamlined configuration procedures. Beyond that, Norton Desktop offers Treasure Chest help, extending context-sensitive tips and shortcuts. And PC Tools' toolbar buttons have pop-up text labels. Almost anything you want to do in either desktop is just a click away.

We've taken an in-depth look at Norton Desktop and PC Tools. We tested several elements of each, including bundled utilities and applications, file management, automatic icon creation, desktop operation, configuration, diagnostics and optimization, multiple desktops, and performance and reliability. Following are our test results and product scores for each of these factors, in addition to overall usability scores.

It's clear that either one of these products will give Windows 3.1 or Windows for Workgroups 3.11 a booster shot. Both throw in the kitchen sink, too, when it comes to bundled utilities and applications. They offer top-flight file management, icon-based program launching, configurable toolbars, right-mouse-button pop-up menus, a desktop trash can, automatic icon creation for files on your hard disk... the list goes on and on. So which one is more usable, powerful, reliable—in short, better? Boiled down, our usability tests show a clear winner: Central Point Software's PC Tools 2.0 for Windows. Turn the page to get the whole story.

## MORE THAN A MIX OF FEATURES

*There are plenty of goodies in Norton Desktop and PC Tools.*

	Symantec Norton Desktop 3.0 for Windows	Central Point Software PC Tools 2.0 for Windows
List price	\$179	\$179.95
Phone	(800) 441-7234, (503) 334-6054	(800) 964-6890, (503) 690-8090
Reader service no.	687	688
Smart group boxes	Optional dynamic updates of icons, selective exclusion of file types.	Optional dynamic updates of icons, automatic building of Smart Groups by application, optional file deletion via icon deletion.
System reliability and optimization	System resource information.	System resource information, automatic resource monitor, Windows optimization.
Program controls	Customizable menus, configurable toolbars, right-mouse-button pop-up menus, automatic full install/uninstall, selective install/uninstall, online tutorial, global desktop configuration.	Customizable menus, configurable toolbars with automatic pop-up button labels, right-mouse-button pop-up menus, automatic full install/uninstall, selective install/uninstall, online tutorial.
Desktop and group boxes	Nested group boxes, drive icons, and other desktop tools.	Nested group boxes, drive icons, and other tools; rubber-band selection of multiple icons; stores app window and size position; custom group-box colors and icon spacing; group-box templates.
File manager	Configurable toolbar, file viewer with more than 100 filters and Clipboard support, directory comparison, file wiping, e-mail.	Configurable toolbar, file viewer with more than 100 filters and Clipboard support, built-in DOS command line, directory synchronization, file comparison, multiple directory branch sizes, e-mail, custom file sorts.



# HP's Dashboard: The Minimalist Approach to Windows

*Don't need icon launching from your desktop? Dashboard's your answer.*

Maybe Windows 3.1 is as close to the Mac's way of doing things as you ever want to get. But, hey, that doesn't mean you have to do without the power and convenience of a desktop shell. Just get Hewlett-Packard's Dashboard 2.0.

Dashboard sounds a lot like what it is—a cockpit for launching applications, controlling printers, monitoring system resources, task switching, and managing virtual desktops. And while it isn't exactly a desktop replacement, you can configure it as a Windows shell.

Dashboard isn't a desktop replacement utility. Otherwise this 1993 PC/Computing MVP Award winner would have been tested right alongside Norton Desktop 3.0 for Windows and PC Tools 2.0 for Windows. It has far fewer features than those packages, doesn't ship with additional utilities for Windows, and lacks a desktop. Hewlett-Packard crams more functionality into this utility than you might think possible. You can customize the program to the nth degree, but part of Dashboard's beauty is that it works just fine fresh out of the box.

Want cool app-launching options? Dashboard's got 'em. It transforms the file-item contents of every Program Manager group box into a pop-down list launcher. This builds on the Windows way of doing things, while giving you a handy

shortcut for opening and closing group boxes to access icons. What's more, like Norton Desktop and PC Tools, you can create Dashboard group boxes inside of other group boxes. You won't find that power in Program Manager. There's even a configurable icon toolbar launcher built right into this utility.

Control is one of Dashboard's strong suits. The program's Printer Manager gives you a visual representation of every printer available to Windows. A button lets you easily set a printer as the current default.

You can configure Dashboard's Extended Screens, or virtual map, to show three, five, seven, or nine virtual windows. Each window can contain a unique set of applications, and you can save and name its current size and position. The possibilities for task-oriented desktops are virtually endless. You

can even ensure that Dashboard is useful when it's minimized. Before you minimize, you can set Dashboard to display either the percentage of free Windows resources or a live miniature of the Extended Screens. And when you minimize Dashboard, the remaining icon displays useful information such as time, date, and resources. No other utility offers anything like that.

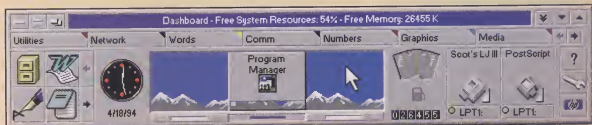
Dashboard's one drawback is its extensive use of screen real estate. The more components and details you configure it to display, the bigger it gets. Fortunately, Hewlett-Packard provides very workable size controls, offering horizontal or vertical orientation, snap-off toolbars, and a high degree of customization, both for the type and size of information that Dashboard shows. Still, it would be nice if you could drag a Dashboard corner to reshape it as a square or scale it to a smaller size without minimizing it entirely.

When it comes to usability and usefulness, Dashboard holds its own. And its \$99 suggested list price and less than 2MB installation make it a worthy alternative to the higher-priced PC Tools and Norton Desktop, along with their massive hard-disk space requirements.

Dashboard 2.0 • \$99 • Hewlett-Packard, PC Software Division • 5301 Stevens Creek Blvd., P.O. Box 58059, Santa Clara, CA 95052 • (800) 554-1305, (408) 345-8931  
Circle No. 686 on Reader Service Card

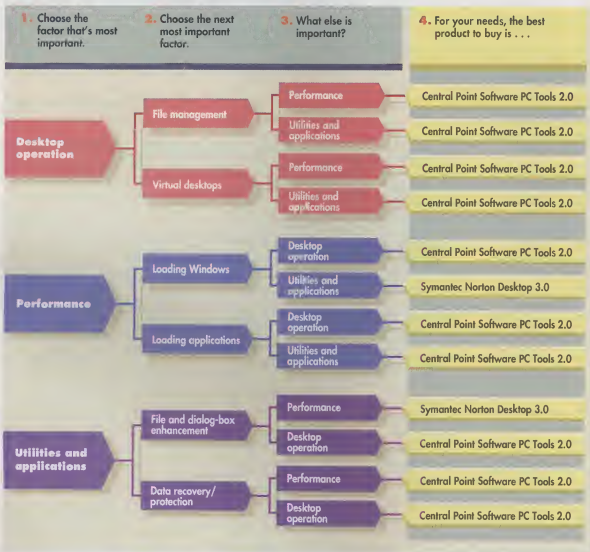


**QUICK LAUNCHER**  
Dashboard's vertical display offers easy access to a Quick Launch toolbar (with the rocket icon above).



**RESOURCE INFO** Dashboard's default configuration shows free system resources, time, date, and available utilities.



**PC/COMPUTING DECISION MAKER***What's the best Windows desktop utility for your needs?***PC TOOLS 2.0 FOR WINDOWS****It's that much better in almost every department.**

Taken in whole or in part, it's no contest: PC Tools is simply a better Windows desktop utility package than Norton Desktop. With a file manager that practically does the dirty work for you, and capabilities like creating virtual desktops, you'll be hard pressed to find a reason not to buy PC Tools. Usability testers agreed—PC Tools doesn't sacrifice ease of use while giving users the power they need.

\$179.95 • Central Point Software • 15220 N.W. Greenbrier Pkwy., Suite 150, Beaverton, OR 97006 • (800) 964-6896, (503) 690-8090  
Circle No. 688 on Reader Service Card



# Attention to User Operations

*Drilling down on testing details to find the usability champ.*



PC/Computing's usability testing is a departure from the more common way of reviewing products, in which a single expert renders an opinion. We scientifically determine how useful, powerful, and easy to learn the products are, with replicable results that are statistically sound. The chances are nine in ten that our tests will find 75 percent of the most frequent usability problems in any product. Testers spend about five hours testing each product according to a script. We then ask testers to rate their satisfaction level with each product. Our usability

rating is based half on tester satisfaction and half on the number of problems that surface.

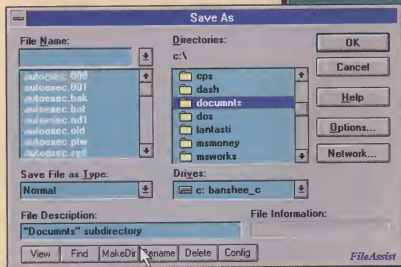
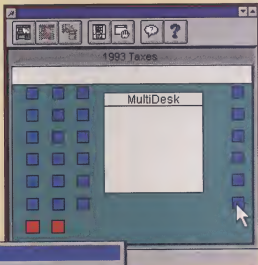
Test scripts are developed by our staff usability experts after extensive research, including what our readers tell us they look for. We then recruit small groups of testers, chosen through rigorous screening to reflect our readership. Testers typically are skilled workers who use desktop computers at their jobs. Criteria include experience with PCs and the product category, and impartiality toward the specific products in the test. The testers are not PC/Computing employees, but they are paid for their time.

## PC TOOLS 2.0 FOR WINDOWS

PC Tools came through with flying colors because it feels good and works the way it should. Great features like CrashGuard and System Consultant are irresistible. Add to that the revolutionary and extremely powerful MultiDesk and you've got a winner. A single virtual mop from MultiDesk, shown here, offers information about what's going on in its window. You have everything from icons for files and applications to a toolbar, new to version 2.0, with all the MultiDesk functions.



SCORE: 92



## NORTON DESKTOP 3.0 FOR WINDOWS

In this case, even the runner-up is a great product. Although Norton Desktop didn't quite measure up to PC Tools, it wasn't far behind in most categories. Some of its best attributes are short Windows loading times, hands-off approach to system resources, and superb implementation of FileAssist, its dialog-box enhancement utility. Don't count Symantec out just yet. It's not likely to settle for second best.

SCORE: 81





## HOW WE TESTED

*A batch of usability testers makes the difference.*

Deciding which Windows desktop utility is best took some doing. To start with, we needed usability testers who could appreciate the many novel concepts these products introduce without being so steeped in a Windows desktop that they would be biased in favor of one product or another.

To solve this problem, we went through something akin to jury selection. And we finally settled on a bevy of testers—an equal number of users familiar with three different products: Norton Desktop 3.0 for Windows, PC Tools 2.0 for Windows, and Windows 3.1 Program Manager.

Our testers spent hours and hours with Norton Desktop and PC Tools, working through a long series of tasks designed to exercise every major aspect of the packages. We put our testers through a set of real-world tasks, including having them configure and customize their desktops with existing applications and their files. We also performed extensive user tests on file management to gauge the intuitiveness and productivity of working with an icon-based file management system. In addition, we had testers rate the importance of the available utilities provided with each of the products.

Our findings are telling: PC Tools emerged the clear victor over Norton Desktop. One tester called it “virtually flawless” and “as close to an object-oriented desktop” as he’d seen under Windows. Another said, “MultiDesk is the best way to work on several different tasks.” A third tester hailed PC Tools’ File Manager as “wonderfully easy to use—the best part of PC Tools for Windows!” The results are conclusive.

## Utilities and Applications

*When you talk about value, Windows desktops corner the market.*

It's just like the prize in a Cracker Jack box. When you buy PC Tools 2.0 for Windows or Norton Desktop 3.0 for Windows, part of the deal is a bonus stack of utilities and applications. There are some really useful programs in there—stuff that's hard for most Windows users to pass up.

Our usability testers ate these utilities and applications like they were candy. Although both programs ship with a blanket of common utilities, when you look closely at them you'll find significant differences. It was a close call, but in the end our usability testers chose PC Tools' toolbox. Here's the list: Which set would you pick?

## TOOLS TO GO



**Symantec Norton****Desktop 3.0 for Windows**

File manager  
File viewer  
Application dialog-box  
file management tools  
Disk repair  
Disk defragmenter  
Backup  
Antivirus  
Unerase  
Disk-crash revitalization  
System information and diagnostics  
Macro language  
Dialog editor  
Event scheduler  
File search  
Icon editor  
Screen saver  
Personal information manager  
Text editor  
Financial calculator  
Tape calculator  
Scientific calculator  
Desktop configuration  
Character map

**Central Point Software****PC Tools 2.0 for Windows**

File manager  
File viewer  
Application dialog-box  
file management tools  
Disk repair  
Disk defragmenter  
Backup  
Antivirus  
Unerase  
Disk-crash revitalization  
System information and diagnostics  
Macro language  
Dialog editor  
Event scheduler  
File search  
Icon editor  
Screen saver  
E-mail manager\*  
Windows installation optimizing  
System resource monitor with alarm  
Automatic group-box creation  
by application  
Directory synchronization  
Screen capture

\*Not bundled, but free on request; a coupon comes in the box.

		Verdict
	<b>PC Tools 2.0 for Windows</b>	<b>94</b>
	<b>Norton Desktop 3.0 for Windows</b>	<b>93</b>





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black & white or simple color images are used. But at the higher dpi levels where crisp, brilliant resolution is critical. Where image quality is directly related to your reputation and your company's image.

The UC1260 offers unparalleled value with features previously found only on more expensive flatbed scanners. Like auto calibration that allows for maximum color accuracy and control. 16.8 million 24-bit colors. 256 shades of gray. Built-in SCSI II for the high performance speed needed for high resolution graphics. 2400 x 2400dpi through software interpolation. And, it performs on the Macintosh<sup>®</sup>, Windows<sup>®</sup>, and UNIX<sup>™</sup> platforms.

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\*These tests were carried out on a Centris 650 with 40MB RAM; 300MB Hard Drive and Adobe PhotoShop 2.5. Results on Macintosh and PC were virtually identical.

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	UMAX <sup>®</sup> UC1260	HP ILCx	Epson 800C
Hardware Resolution	1200 x 600dpi	400 x 400dpi	400 x 400dpi
Maximum Resolution	2400 x 2400dpi	1600 x 1600dpi	1600 x 1600dpi
Maximum Scanning Area	8.5 x 14"	8.5 x 11.5"	8.1 x 11.0"
Scanning Throughput*			
300dpi/8.5 x 11"	2:00 Minutes	1:55 Minutes	4:05 Minutes
600dpi/8.5 x 11"	5:22 Minutes	9:27 Minutes	17:35 Minutes
800dpi/4 x 5"	2:20 Minutes	3:38 Minutes	6:36 Minutes
1200dpi/4 x 5"	5:28 Minutes	9:05 Minutes	13:00 Minutes
Single Lamp Design	Yes	No	No
Software Bundles	Complete PhotoShop	PhotoShop LE	PhotoShop LE
Descreening	Yes	No	No
Unsharp Masking	Yes	No	No
Suggested Retail	\$1,395	\$1,179	\$1,500



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UC840

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## File Management

*It's a dirty job, but here's the best way to get it done.*

Sooner or later, even a 500MB hard drive fills up. So you can't put this off forever. File management is tedious, and nothing will ever make it fun. But with the right tools, at least it doesn't have to take a long time.

Start with PC Tools 2.0 for Windows' powerful, refined file manager. Ever want to know the complete size of a branch of subdirectories? File Manager's got it. How about automatic vertical window tiling for two-drive window operations? It's in there. Need a built-in DOS command line? Yup. Want to use drag and drop to select files in the file window? Uh-huh. Could you use one-click sorting of files by filename, extension, size, or date? It does that. What about a one-click select-all-files-but-not-subdirectories-in-the-file window? You bet. Wish you had two-level custom file sorts? Check. Directory synchronization? Yes. File Comparison? Full icon view in the file window? User-added file comments? Integral file viewer? PKzip 2.0 file compression? Extensive right-mouse-button pop-ups? Yes, yes, *yes!*

### WAIT, THERE'S MORE

If you've ever sat down and made a wish list for file management, Central Point Software probably just crossed everything off. There's something else, too. Aside from offering a slew of file management features, Central Point Software has made those features very easy to use. In fact, some of our usability testers actually found that they liked using PC Tools' File Manager.

Windows file management gets easier from another perspective, too. Both desktop utilities place a handful of

file management tools right onto the File, Open; File, Save; and File, Save As dialog boxes of virtually every Windows application installed on your system (or any that you may add to your system in the future).

If you've ever used WordPerfect for Windows, you know how handy this can be. Say you create a new document, work on it for a while, then realize you should save it before some yahoo digging a posthole severs a power line. You choose File, and Save As, but want to place the file in a new directory. Before, you would have had to load File Manager or shell out to DOS to create the new directory. With Norton Desktop or PC Tools, you can create the new directory right from your application's dialog box.

### BUT IS IT EASY TO USE?

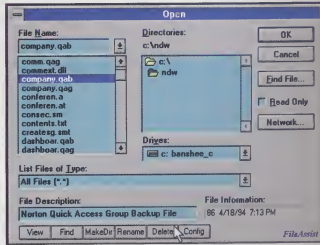
Our testers preferred the Norton Desktop implementation of these dialog-box enhancement functions. Its approach literally rebuilds your application dialog boxes, placing file management buttons right on the dialog box—so they're only a mouse click away when you need them most. By contrast, PC Tools adds an icon on the dialog box's title bar that drops down a list of functions.

Overall, PC Tools' file management tools carried the day. Its dialog-box enhancement tools are almost as powerful as Norton Desktop's, and PC Tools' File Manager is nothing short of awesome.

		Verdict
<input checked="" type="checkbox"/>	PC Tools 2.0 for Windows	97
<input type="checkbox"/>	Norton Desktop 3.0 for Windows	86



**BEST-EVER FILE MANAGER** PC Tools' File Manager underwent dozens of usability improvements for this new version. It's simply the best of its kind.



**DIALOG-BOX FILE TOOLS** Norton Desktop's dialog-box enhancement tools are well polished. They let you view, find, create, rename, delete, and configure directories.



## Automatic Icon Creation

*Now it's easy to work with your data files as graphical objects.*

It's like flying blind. That's what working in an object-based graphical desktop environment is like when there are no icons for the data files on your hard drive. Fortunately, PC Tools 2.0's AutoSync Folders and Norton Desktop 3.0's Smart Groups change all that.

Sure, you've always been able to create icons for data files under Windows. You can drag filenames from File Manager to any group box to create icons for them. But for most people, the sheer number of data files on their hard drives makes this a lot of work. Plus, what happens when you delete one of those files, or create 15 new ones using your word processor? To accomplish these tasks under Windows, you'd spend hours tracking the icon deletions and additions to match the files resident on your disk.

That's where desktop utilities come in. Symantec and Central Point Software use the terms *Smart Groups* and *AutoSync Folders*, respectively, to refer to the fact that group boxes in both packages can dynamically insert or erase file icons as you create or delete files on your hard disk in DOS, a file manager, or any other application.

Moreover, it doesn't require a degree in computer science to set up this powerful feature since both desktops use an expanded Properties dialog box (accessible through the Save As dialog box in Windows). To set up a dynamically updating smart folder, you choose a specific directory on your hard disk to link the folder to. Next you enter the file extensions that you want the smart folder to automatically create and delete icons for. Or you can choose wild-card symbols to have it track all files in the directory. Afterward, whenever you open the smart folder, it will update its icon contents. And if you leave it open while you manage files, it will update the icons on the fly.

### WHAT'S IN IT FOR YOU?

Your biggest question before taking automatic icon creation for a test flight is probably, Why would I want this? Anyone who subscribes to the desktop strategy of

operating has already begun working with files as objects. Drag and drop is a big part of the object-based desktop approach to working with programs and data. Once you populate group boxes (and possibly the desktop) with icons of your applications' data files, many of the operations previously carried out with application dialog boxes—like File Open, Print, View, and Compress—can now be managed with quick mouse actions directed at desktop tools. Until you try this, you may not fully grasp how much more productive it will make you.

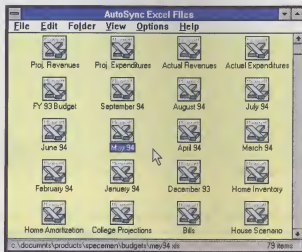
PC Tools goes a step further than Norton Desktop by

facilitating drag and drop for one of the most common file actions: file deletion. True, in either shell you can delete an icon by dragging it to a desktop trash can, but PC Tools is the only desktop shell that gives you the option of deleting the actual file from your hard drive (as opposed to deleting only the icon, which requires you to take extra steps to remove the file from your hard drive). That's a serious departure from the Windows 3.1 method of doing things—and one that might sound a little dangerous. But PC Tools has the advantage of letting

you quickly and easily delete a file that you know you don't need because you just looked at it. And since file icons can accommodate long, descriptive names, it's possible that you won't need to open a file to know that it's headed to the trash can. Of course, if you don't want the file deletion capability in effect, it's easy to turn off. In fact, it's turned off by default.

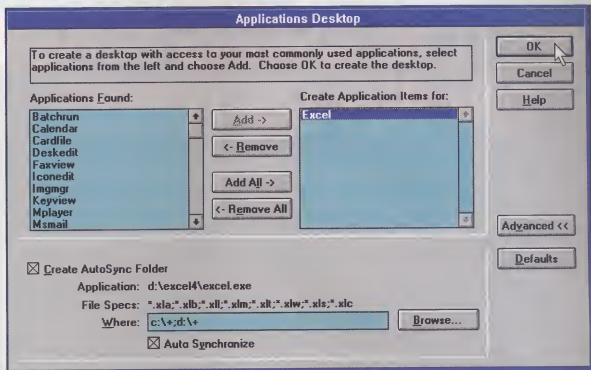
### APPLICATION FOLDERS

There are other ways that PC Tools' AutoSync Folders surpass Norton Desktop's Smart Groups. With Norton Desktop, you link a Smart Group to a specific directory on your hard drive. PC Tools extends this functionality by letting you assign a group box to one directory, several specific directories, all the directories on a drive, or even multiple drives. This gives you a whole new way to work: application folders. These are individual group



**APPLICATION FOLDER** PC Tools built a collection of 79 Excel data file icons (a portion of which are shown here) in about a minute—and those Excel files were spread across two hard drives. Try to do the same in Program Manager.





**APPLICATIONS DESKTOP** Don't do anything laboriously, that's our motto. PC Tools' Desktop Builder follows that credo and fully automates the process of setting up group boxes.

boxes that contain file icons for every document on your hard drive created by a specific application.

If you've structured your hard drive so that, for example, all of your word processor files are in one directory and all of your spreadsheet files are in another directory, then the Norton Desktop approach should work well for you. But if you've structured your directories in some other manner—say, on a project-by-project or monthly basis—then you've probably got word processing, spreadsheet, database, and other file types sprinkled around numerous document directories. Since AutoSync Folders in PC Tools let you specify multiple source directories, you're still in business.

## ORGANIZE YOUR TASKS

Application folders come in very handy. They're a great way to find duplicate files, organize templates, and view documents without regard to subdirectory structure. But you don't need to be limited to organizing your data by application only—the same capability can be used to arrange folders by task. For example, you might create an AutoSync Folder that contains icons for all the programs and data you use in budgeting, even though the actual

spreadsheet and word processing files are located in several different directories on your hard drive.

And Central Point Software didn't stop there. It added Desktop Builder to PC Tools to automate the process of creating application folders. Desktop Builder works similarly to the way Windows' Setup builds icons for existing EXE and COM files. But instead of building only program icons, it finds all the applications on your hard drive, lets you choose the ones to build application folders for, and then automatically creates AutoSync Folders for each of them, applying the appropriate file extensions from an internal database. And since this is also an installation option, you can start out right away with application folders for all the programs installed on your system.

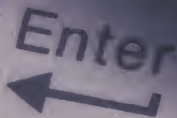
Even though PC Tools' automatic icon creation features are more powerful than those in Norton Desktop, our usability testers found them easier to use. And that makes AutoSync Folders and Desktop Builder a high-flying combination. PC Tools bested Norton Desktop here, too.

Verdict		
<input checked="" type="checkbox"/>	<b>PC Tools 2.0 for Windows</b>	<b>98</b>
<input type="checkbox"/>	Norton Desktop 3.0 for Windows	86



# FROM NOW ON, THESE ARE THE QUESTIONS YOU'LL BE ASKING BEFORE YOU BUY SOFTWARE.

1. Do your programs work together intuitively as if they were all one program?
2. Can you simply drag text, data and graphics from one program and drop them into another?
3. Is your software intelligent? For instance, can it handle everyday tasks automatically?
4. Are your programs recognized as the best in their category?
5. Do your menus, toolbars and other elements look alike and work in the same easy way?
6. Do your programs have no-charge product support? For how long?
7. Ultimately, is it worth getting software that doesn't do all these things?





## You can find all the answers in one place.

You have a number of different jobs to accomplish. Every day. So your business software is key to putting together all the right answers.

Enter the new Microsoft® Office.

For the first time ever, individual programs work together like a single, insightful program.

What does that mean? You can concentrate on the task at hand. And forget about jumping around between programs.

This power to work like one program springs from our unique innovations. Take OfficeLinks. Built with the integration standard, OLE 2.0, it lets you drag a chart from your spreadsheet and drop it into your word processor. Then automatically convert everything into presentation slides. Or create custom letters from your database of clients with just a click. All as if you're using one program.

These programs even think the same. Their exclusive IntelliSense™ technology can sense what you need, then make everyday jobs like fixing typos happen automatically.

Together, they're so notably consistent in looks, actions and instincts, there's no question you'll

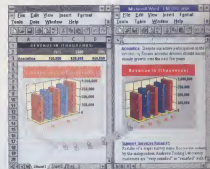
think of them as one program.

And only the Microsoft Office combines it all with unlimited no-charge support. Microsoft just won the ITAA Quality Award\* for that support. A singular distinction.



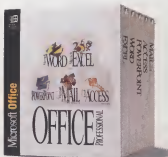
Of course all this "oneness" could only come from the most acclaimed, technically proficient individual programs around—Word, Microsoft Excel, PowerPoint® and Microsoft Access®.

We've barely scratched the surface here of what it means for all your programs to work together like one. You'll want to read the reviews



yourself, talk to people who use it, scout around at your nearest reseller. And by all means, call us at (800) 894-6642, Dept. LB9, to find out more. Any questions?

# Microsoft Office



The Microsoft Office Professional includes Microsoft Excel, Word, Microsoft Access, PowerPoint and a Mail workstation license.

(Upper right) Just click a button on the Microsoft Office Manager (MOM) toolbar and your choice of first-rate programs pops into action.

(Lower right) Need to move information between programs? Just drag and drop it from one place to another. Then edit right in place.

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## Desktop Operation

*A Windows desktop utility is a great application-launching platform.*

One of this nation's most historic highways, Route 66, has all but disappeared from view. You'll have to look closely to find it on any road map, and you'll practically need a scout to find it without one. You can't afford that kind of obscurity when it comes to tracking down and launching the applications that you use every day. And while Windows desktop utilities offer an abundance of directions for launching applications, you need a program that lets you find and map a familiar route to your applications that's available at every turn.

The desktop—that colored area behind Program Manager—offers this familiarity for some people. Unlike a toolbar or menu launcher, such as Hewlett-Packard's Dashboard 2.0, the desktop backdrop is much harder to lose behind open application windows. Both Norton Desktop and PC Tools let you place icons on the desktop. From there, simply double-click on the icons to launch programs. Double-clicking on data-file icons on the desktop will launch the application and load the file. Both Windows desktop utilities do this.

Using the desktop as a launchpad tends to promote task switching and multitasking, at least for those who have enough RAM to keep several applications running simultaneously. Rather than loading and unloading an application every time you need it, you minimize it on your desktop, where it's standing by, ready to run. The capabilities to minimize applications and easily switch between active tasks are two of the big advantages that

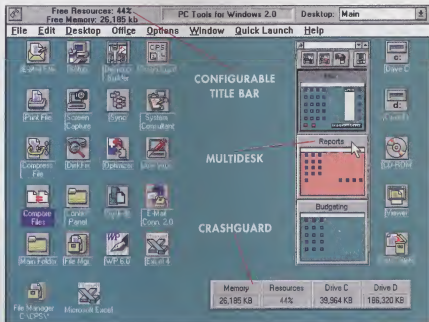
PCs have over Macs. Both Norton Desktop and PC Tools were designed to take full advantage of this.

Since we tend to fall back on what we know best when we're busy, an important improvement that both Windows desktop utilities provide is the ability to create nested group boxes. Nesting means that you can place a group box inside another group box, place both of those group boxes in a third, and so on.

Every group box is an island in Program Manager, and therefore can't be nested. So you can't group collections of icons—such as ones for WordPerfect for DOS, WordPerfect for Windows, Windows Write, and their data files—in a group box containing other group boxes. If you could, you'd be able to organize documents and applications by application, task, or any other structure that helps you remember what and where things are. For most people, the upshot is one of two things: either a few group boxes littered with dozens of icons, or a checkerboard of group boxes, each containing only a few icons. Either way, it's hunt-and-peck city, and no matter how carefully you organize your icons, you'll never be able to reap the benefits. Nested groups are a small detail that can make a big difference in your productivity.

Sometimes it's the small conveniences that give you the biggest efficiency boost. And that's where PC Tools really shines. For example, when you want to move several icons from one group box to another in Program Manager, you must laboriously drag and

**QUINTESSENTIAL DESIGN** PC Tools' desktop metaphor arranges the tools you need most at your fingertips. In this example, application icons are on the left while disk, trash can, and file viewing tools are on the right.







**RUBBER-BAND SELECT**  
PC Tools' fast, intuitive way of selecting multiple icons makes group copies and moves a snap.

menus available than Norton Desktop, and some of these menus are customizable. For example, a click in the File Manager will reveal a list of file management options that is completely customizable.

Windows desktops are by no means perfect. When it comes down to it, toolbar launching has a lot of untapped

drop each one. PC Tools allows you to group-select icons using its rubber-band selection function. Just drag the imaginary rubber band around the icons you want to highlight and let go of the mouse button. There are right-mouse-button pop-up menus everywhere on both desktop utilities, but they're best implemented in PC Tools. It has more right-mouse-button



**GROUP-BOX TOOLBAR** You can change any group box into a toolbar in PC Tools (shown here) or Norton Desktop. When you click once on an icon, the status bar tells you what it is. Click twice and the program launches.

potential. Both Norton Desktop and PC Tools can transform their group boxes into toolbar approximations, but in future upgrades, Central Point Software and Symantec should consider mounting a button toolbar on the active-application title bar so it will always be available to the user. But that's nit-picking. Overall, our usability testers fell for the design of PC Tools' desktop.

		Verdict
<input checked="" type="checkbox"/>	PC Tools 2.0 for Windows	99
<input type="checkbox"/>	Norton Desktop 3.0 for Windows	92

It's about time a computer company listened to my needs. Not just tell me what they think I need.

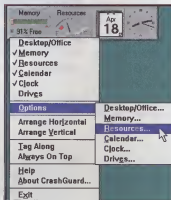


## Configuration

*Click, click, click. Menu-based setting of dialog boxes is practically a thing of the past.*

The biggest headache with Windows desktop utilities has always been the numerous decisions you have to make after installation: confirmations, icon positioning, group boxes, preference settings, desktop tools, and configurable toolbars and menus. And because these products ship with loads of utilities, you wind up slogging through even more setting screens as you try to determine which utilities and applications you'll need to have most readily available. It's a morass of dialog-box check-offs, drop-down list selections, and Browse-box path selections only a computer nerd could love.

We wish we could say the developers had solved this problem, but Windows shells are still complicated. They are, however, becoming significantly more



**INSTANT ACCESS** The closest thing to configuration on the fly: Press the right-mouse button on PC Tools' *CrashGuard*, for example, and up pops its configuration menu ready to go.

usable. Norton Desktop made this job No.1, doing away with numerous menu-based dialog boxes and refitting them into a graphical, maplike configuration utility called the Control Center. PC Tools lacks this kind of unification, and it still has menu-based dialog boxes for some settings. What makes it easy to configure is a heavy emphasis on right-mouse-button pop-ups. So you can configure anything you see just by clicking it.

Both programs are light years ahead of their previous versions in ease of configuration. But they still have a long way to go.

Norton Desktop could use some rethinking about the way it groups its settings on the screens below the Control Center map. And in some



Our new 75MHz notebook gives you

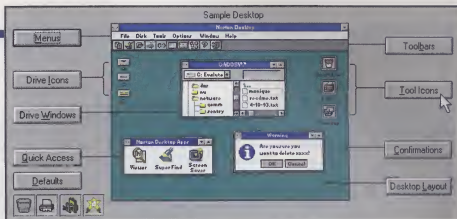




areas, believe it or not, its degree of control just isn't fine enough. Central Point Software should consider a unified configuration utility similar to the Control Center for PC Tools, without sacrificing its terrific right-mouse-button pop-ups. And PC

Tools would be a better product if it provided global defaults. One of its configurational strengths is extensive font, color, size, and positioning options for group boxes, icons, text labels, and so on. But there's no way to configure permanent user settings so that every new group box created by you or by an installing application will look the way you'd like it to.

When the smoke cleared, our usability testers preferred PC Tools' on-the-fly configuration strategy by a



**CONTROL WEAPON** You always know you have the power to modify Norton Desktop's configuration. And most, if not all, of the graphical settings screens are easy to grasp.

hair. They appreciated the accessibility of configuration options. And while proactively clicking check-offs and pressing buttons in Control Center probably saves time in the long run, we guess, no one would willingly face this chore head on if they didn't have to.

		Verdict
	PC Tools 2.0 for Windows	95
	Norton Desktop 3.0 for Windows	94

**The new TI TravelMate™ 4000E WinDX4™/75MHz notebook.**  
With its IntelDX4™ processor, you have the power to be more productive.



At Texas Instruments, we've listened to your needs. And that's why we've created a new way for you to save time and increase productivity – with the TravelMate 4000E WinDX4/75 notebook.

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**TEXAS  
INSTRUMENTS**

Circle 206 on reader service card.





## Diagnostics and Optimization

*Analyze your PC and Windows to make them run faster and more reliably.*

The Norton System Information utility has long been the first line of defense when something shakes loose or you need to know more about your PC. However, System Information's value has been eroded by Microsoft's Diagnostics, which provides information specific to your hardware configuration, and Microsoft's System Info, which gives you information specific to Windows. Combined, these utilities provide services similar to Norton's System Information (though Microsoft's Diagnostics and System Info are not as graphical or easy to use), and they ship for free.

Windows also ships with a lesser-known utility called Doctor Watson. Set up Doctor Watson in advance and it will run in the background, making note of system information as you work within applications. Then if your system crashes, Doctor Watson offers a detailed report about what may have caused the crash, which

**Do It**



**Recommend**

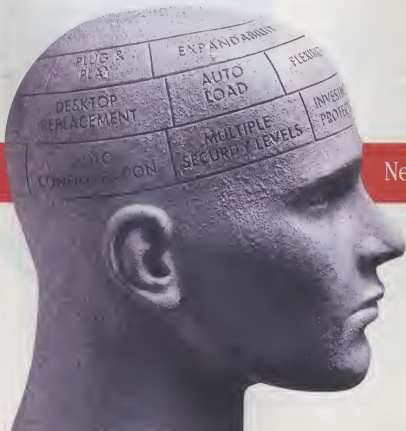
**INTELLIGENT ADVICE** They don't look like much, but PC Tools' buttons and recommendation lines can help make Windows and your PC safer and faster.

might help you prevent similar crashes from happening in the future. This may be a useful tool, but there aren't any preventive measures you can take in Windows alone to avoid such problems.

That's why Central Point Software created System Consultant. In PC Tools 1.0 for Windows, it covered all of the reporting areas of Symantec's System Information, such as system, disks, Windows memory, video, devices, interrupts, and benchmarks. Central Point Software also added NetWare reporting and something called system recommendations, which analyzed your system and suggested changes to make Windows run faster and more reliably. System Consultant even provided detailed explanations and caveats for

each recommendation—a great idea.

The new System Consultant tweaks a few things here and there, but its main claim to fame are two new buttons



**New Intelligent Docking: So smart it**





that appear at the bottom of the system recommendations window: Do It, and Undo. The Do It button automatically implements a specific suggestion when you choose it. Undo reverses that action, even if you change your mind months later. Central Point Software has made heavy use of Microsoft's *Windows Resource Kit* and other reliable sources for its recommendations and explanations, so you're not likely to go wrong taking System Consultant's advice.

### SAFETY NET

Place PC Tool's CrashGuard in your startup folder, and thereafter it will stand watch over Windows' graphical device interface (GDI) and user system resources, RAM usage, and free disk space. You can configure it to pop up message boxes or sound warnings when any of the resources it guards fall below a level you select. And it shows up onscreen as a rectangular group of digital or

Increase the value of DMABufferSize in your SYSTEM.INI file  
Add NoEMMDriver=On to your SYSTEM.INI file if you are not using EMS  
Use a defragmenter on drive c: to improve disk performance

**PREVENTIVE MEDICINE** Catch Windows crashes before they bust you. PC Tools' CrashGuard is an easy-to-use apple-a-day for your PC.

analog readouts that you can rearrange for size, order, and orientation. The first shipping Norton Desktop 3.0 has nothing like PC Tools 2.0's welcome CrashGuard utility, but you might want to check out System Launch in the recently released Symantec Norton Utilities 8.0.

Do It, Undo, and CrashGuard are powerful arguments in favor of PC Tools 2.0 for Windows. Our testers even preferred System Consultant's system diagnostics over those of Norton Desktop's System Information. Once again, PC Tools is the clear choice.

	Verdict
 <b>PC Tools 2.0 for Windows</b>	<b>76</b>
 <b>Norton Desktop 3.0 for Windows</b>	<b>25</b>

## An industry first from Texas Instruments: Automatic load and system configuration.

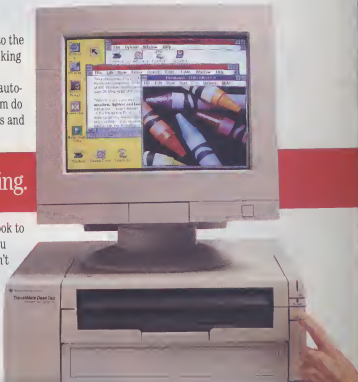
We call it the ultimate desktop replacement. You'll call it remarkable. It's our new TravelMate™ Intelligent Docking System\*. And by listening to the needs of notebook users, we've created the industry's most advanced docking system available. It's also the most complete.

Just insert any TI TravelMate 4000E notebook computer into the auto-loading mechanism, push a button, sit back and watch the docking system do the rest. Expansion is a snap too, with six ISA and two PCMCIA card slots and four drive bays.

it knows if your TI notebook is coming or going.

Our Intelligent Docking System makes the transition from notebook to desktop replacement fast and easy. When you dock, it knows whether you have an external monitor, keyboard or internal modem. Meaning you don't have to reconfigure each time you insert your TravelMate. When you're ready to hit the road, simply click an icon and the system knows to save the file you're working on, close Windows™ and eject your TravelMate. Then away you go. That's true desktop replacement. From the one notebook company who listens.

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INSTRUMENTS**



\*Color monitor shown above not included with Intelligent Docking System.

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## Multiple Desktops

*MultiDesk's a productivity booster—and only one of these desktops has it.*

It's really quite simple. Any three tasks you manage on one desktop can be performed more efficiently on three desktops. That's the premise behind PC Tools' MultiDesk desktop virtual map, a scalable representation that shows labeled miniatures of all your configured desktops. Click a different desktop on the map and the whole screen changes to show the new desktop. You can drag and drop icons from one miniature desktop to another, or from the current full-sized desktop to any of the miniatures. You can even leave your applications loaded on any preconfigured desktop.

One drawback to MultiDesk is that it eats up system resources while it's running. Because of this drain, Central Point Software provides an option in PC Tools that allows you to turn off individual desktops or to turn off MultiDesk altogether. Fortunately, if you do decide to turn off MultiDesk at any time, the desktops you've already created will be saved on your system.



**MULTIPLY AND CONQUER** You use different tools for different jobs. Why not use desktops tailored to specific tasks? You can with PC Tools.

PC Tools aced this test because Norton Desktop doesn't have the feature. And if you find that you don't like it, just turn it off. But we think MultiDesk is a significant part of what makes PC Tools 2.0 for Windows the best Windows desktop utility package there is.

		Verdict
	PC Tools 2.0 for Windows	59
	Norton Desktop 3.0 for Windows	0



We're listening. We're learning.





## Performance and Reliability

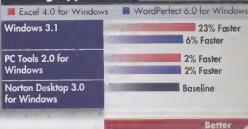
*Load times and memory usage are keys to usability.*

Our tests found that Windows desktop utilities don't load Windows and applications faster, and now they're greedier with system resources than Windows 3.1. When it boils down to the speed required to load individual applications, Windows is faster than Norton Desktop and PC Tools. This difference is especially noticeable when loading Excel. You'll find the same pattern in loading Windows. Resource availability, however, is nearly equal among the three products. Overall, Norton Desktop nosed ahead of PC Tools in performance and reliability. But if Symantec and Central Point Software are listening, we want more improvement!

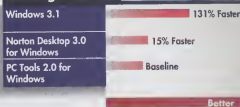
**TEST RESULTS** Windows 3.1 is faster and uses fewer system resources than Norton Desktop and PC Tools. But the power these shells pack is well worth the trade-off.

	Verdict
<input checked="" type="checkbox"/> <b>Norton Desktop 3.0 for Windows</b>	<b>98</b>
<input type="checkbox"/> <b>PC Tools 2.0 for Windows</b>	<b>93</b>

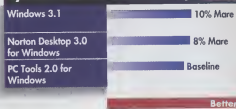
### Loading Applications



### Loading Windows



### System Resources Availability



## The most comprehensive line of 486 notebooks designed specially to meet your needs.

When it comes to listening to your notebook computer needs, at Texas Instruments we hear what you're saying. And it shows in our TravelMate™ 4000E Series. After all, we offer a wide range of 486-based notebooks plus an Intelligent Docking System with your needs in mind.

You'll find the entire high-performance lineup, from our economical monochrome WinSX™/25 to our all-new super-fast active matrix color WinDX™/75 powerhouse, is ideal for both portable and desktop needs. The critics agree. To start with, Texas Instruments notebooks are the only products in any category ever to win five *PC Magazine* Editor's Choice Awards in a single issue.\* And that's just the beginning.

But there's really only one way to find out if a TravelMate 4000E is right for you. Try one!

We're delivering.

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DISPLAY	PROCESSOR	MEMORY
Active Matrix Color (15")	IntelDX4-75MHz	4MB RAM/16MB HDD
Active Matrix Color	IntelDX4-75MHz	4MB RAM/32MB HDD
Active Matrix Color	486DX3-50MHz	4MB RAM/32MB HDD
Dual Scan Color	486DX3-50MHz	4MB RAM/32MB HDD
Color	486DX3-50MHz	4MB RAM/32MB HDD
Color	486DX3-50MHz	4MB RAM/32MB HDD
Monochrome	486DX3-50MHz	4MB RAM/32MB HDD
Monochrome	486DX3-50MHz	4MB RAM/32MB HDD

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COMPATIBILITY	EXPANSION	INTERFACES
TI TM4000	Six 16-bit ISA slots	Parallel/2 Serial, VGA
Series Notebooks	two PCMCIA Type III slots	Mouse, keyboard, game port and RJ-11 jack
	four drive bays	

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## PC/COMPUTING SCORECARD

*Central Point Software's PC Tools emerges as the overall winner.*

FACTOR	Central Point Software PC Tools 2.0 for Windows	Symantec Norton Desktop for 3.0 Windows
Utilities and applications 15%	<b>94</b> Extras like E-Mail Connection 2.0 and Desktop Builder give it the edge.	<b>93</b> A close call, and Norton's bevy of utilities is nothing to sneeze at.
File management 15%	<b>97</b> A superb file manager and a very good dialog-box enhancement utility win.	<b>86</b> FileAssist dialog-box tools are excellent, but the file manager falls short.
Automatic icon creation 5%	<b>98</b> More power and more automation make AutoSync Folders a better implementation.	<b>86</b> Smart Groups are good, but no match for PC Tools' AutoSync Folders.
Desktop operation 20%	<b>99</b> Group-box controls, right-mouse-button pop-ups carry the day.	<b>92</b> All the same features as PC Tools, without quite as much polish.
Configuration 10%	<b>95</b> Settings aren't integrated, but pop up where you need them, when you need them.	<b>94</b> Norton Desktop's configuration utility is a great idea, but PC Tools' method is easier to use.
Diagnostics/optimization 10%	<b>76</b> System Consultant and CrashGuard are head and shoulders above the competition.	<b>25</b> Plain and simple: System Information got leapfrogged.
Multiple desktops 5%	<b>59</b> MultiDesk is a great way to manage multiple tasks.	<b>0</b> Not available.
Performance/reliability 20%	<b>93</b> Fast application launching times, but slow to load Windows.	<b>98</b> The champ in this area overall, but comparatively greedy with system resources.
<b>TOTAL SCORE</b>	<b>92</b>	<b>81</b>

## PUT DESKTOPS IN PERSPECTIVE

*A taste of things to come from the next version of Windows.*

They may sound exotic now, but graphical desktops will probably be quite familiar by this time next year. The next version of Windows will have desktop functionality that's apt to make PC Tools and Norton Desktop look like training wheels for DOS.

In the meantime, there are several elements you'll find in today's desktops that are likely to have counterparts in future Windows versions:

**DESKTOP** Windows 3.x has one desktop, the background behind Program Manager, but the only thing it's ever been good for is displaying minimized application icons. Being able to place icons for programs, tools, and files on the desktop is in Windows' future, too.

**FILE OBJECTS** Every file on your hard disk will be treated as an object. It will be on icon, and you can do anything to or with that icon that you can do from File Manager—move, copy, delete, print, and so forth.

**TRASH CAN** The Macintosh, OS/2, and Windows desktops have had graphical icons for files for years. Expect something similar to this from Windows. Norton Desktop can't currently delete the file with the

icon, but PC Tools gives you the option to do so.

**LONG FILENAMES** Under the new Windows, you will be able to save files with names up to 255 characters in length. Like current Windows, PC Tools and Norton Desktop let you name icons with long, descriptive labels. What's different with this capability is that you're more apt to take advantage of it because Windows desktop utilities make working with file icons much easier by using automatic icon creation, nested folders, desktop icons, and better association capabilities.

### PROGRAM MANAGER AND FILE MANAGER

Norton Desktop has nothing like this, and PC Tools offers only a teaser. Group boxes become drive windows, so they look like a desktop in a box, with labeled folder and file icons. Since they're objects, they can be treated in any way you would treat files in File Manager.

Why does Windows need all this stuff—and why do you? One word: productivity. If you're used to Program Manager now, all of this might seem like a lot to take in with hardly a productivity blast. But once you get used to the new way of working, you'll never go back. Honest. ☐



# You're In Control.



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**Introducing the ViewSonic 17G** — the first in our “Graphics” line of monitors. It's unique! It's powerful! And it's affordable!

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This feature-rich 17-inch\* monitor beats the competition — and the suggested retail price is only \$999 USD!



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Image courtesy of Autodesk Image Development Lab.  
\*17" CRTs yield 15.5" to 15.7" diagonal viewable screen.

Circle 170 on reader service card.



# PowerViewer

It's 9:00, Monday morning and you've just learned the horrifying news. That big meeting with the president of the company next week? It's been moved up. Way, way up. And that report for the big meeting? It's due in half an hour. Fortunately, you've got PowerViewer™ for Windows™, the one tool that lets you access virtually any database and create presentation-ready reports with a few simple clicks of the mouse. You take a long sip of coffee, sit down in front of your computer and click open PowerViewer.

## Access More Information.

Click. Quickly, you access the Connect Profile menu and select the database you want. Because PowerViewer supports over 25 of the most popular PC and relational databases, all the information you need is right at your fingertips. And with Powersoft's Database Connection Hotline, you know any questions you have will receive immediate answers. Click. You go into the Report Painter and select the specific data for your report using one of PowerViewer's powerful point-and-click query techniques. You choose the one that suits you best, whether it's our easy-to-use QuickSelect, our powerful graphical query builder, or a query you've saved from a previous task.

Click. Now you're ready to create your report. You select one of the many built-in QuickStyle

## Create Stunning Reports.

templates that enable you to create stunning reports with full-color 2D and 3D graphs and charts. PowerGuides and Data Smart design tools lead you through every step and let you preview and customize any aspect of your report in seconds. Include a pie chart. Change fonts. Add colors. Pull in your corporate logo. And click, click, click — suddenly, you've created a masterpiece.

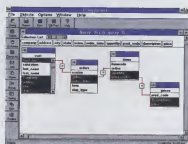
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Click  
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Click  
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Click  
Click  
Click  
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[illegible]

Table to Table

To display comments for a table in criteria, press and hold the right mouse button.

OK Cancel Add All Help

Tables:

- tbl\_unde
- tbl\_dep
- tbl\_mech
- tbl\_gnd
- tbl\_adm

Criteria:

- tbl\_gnd
- tbl\_dep
- tbl\_mech
- tbl\_gnd
- tbl\_dep

Comments:

Criteria	First Name	Last Name	Department Name	Quantity
tbl_gnd				
tbl_dep				
tbl_mech				
tbl_gnd				
tbl_dep				

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# Silent Partners

*Soon to be your sidekicks, smart software agents will do much more than offer jazzy help. They may even take over the whole job.*

BY STEVE DITLEA

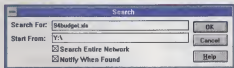
IT'S 3:00 P.M. and you have to get your hands on the '94 budget numbers. Oh, and you need them in time for tomorrow morning's management meeting. Are you sweating it? No way: You have the world's most reliable assistant, who will relentlessly scour the network for the spreadsheet you need. You won't even have to pay overtime. It's all in the line of duty for your average software agent.

Just turn to your PC and instruct your agent what to search for and where by setting parameters with a click or two of the mouse. While you finish up the day's business, your

agent will scour online databases, gathering the information you need and returning it to your PC.

Welcome to the new PC software order. After nearly a decade of nonstop feature wars—the escalation of

*“How can I get that file from Operations when Joe's out sick?”*



**Automate search:** No need to waste time searching for a file. Have an agent do the dirty work.



**Assign task:** After you click OK, the agent is off and running.





**Agent working:**  
Bingo! The agent has found the file and brought it back to your desktop.

ever-mightier program functions for ever-more-rarefied tasks—software developers are getting back to the original vision of personal computing. What most PC users have always wanted is a way to turn their PCs into electronic brains that can take over tedious business procedures and simplify their complex tasks. So it should come as no surprise that in place of

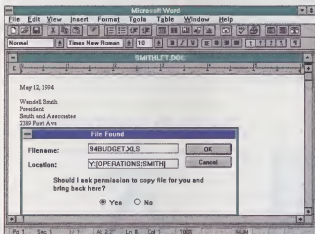
	A	B	C	D	E	F	G	H
19	Houston, TX			\$54,500	\$54,500	\$54,500	\$54,500	\$54,000
20	Science	4-1002	22000	22000	22000	22000	22000	22000
21	Supplies	4-2310	5000	5000	5000	5000	5000	5000
22	Equipment	4-2543	8500	8500	8500	8500	8500	8500
23	Lease/Pmts	4-7852	17000	17000	17000	17000	17000	17000
24	Advertising	4-8752	3500	3500	3500	3500	3500	3500
25	Boise, ID			\$27,250	\$27,250	\$27,250	\$27,250	\$27,250
26	Science	3-1002	7700	7700	7700	7700	7700	7700
27	Supplies	3-2310	2100	2100	2100	2100	2100	2100
28	Equipment	3-2543	6500	6500	6500	6500	6500	6500
29	Lease/Pmts	3-7852	8500	8500	8500	8500	8500	8500
30	Advertising	3-8752	2200	2200	2200	2200	2200	2200
31								
32								

**Task complete:** Thanks to your agent, you can now get to work on crunching some budget numbers in your spreadsheet.

yesterday's buzzwords—*power* and *productivity*—today's software vocabulary is brimming with the likes of *intelligence* and *smarts*.

Mainstream business applications now offer incarnations of intellect with names like Assistants, Coaches, Experts, and Wizards. The major vendors are already devising next-generation solutions that move core applications closer to anticipating users' needs. In the pages that follow, we'll look first at the current approaches to software automation from companies like Borland International, Lotus Development, Microsoft, and WordPerfect. Then we'll focus on what these vendors, and other major players, have in store for years to come.

While your word processor and spreadsheet get smart, scripting languages such as General Magic's Telescript will soon cull information from corporate databases and screen your e-mail. It's only the tip of the iceberg. Programs with embedded intelligence will make suggestions to improve your productivity. At the same time, a secret agent may be telling your supervisor when you play Solitaire. It's a brave new world, filled with problems as well as promise.



**Background operation:** While you're writing a letter, your agent searches the network for the file.



"I WANTED AN agent to be responsible for getting something done while I was busy with a research problem," says Oliver Selfridge. It was this vision that prompted the former Massachusetts Institute of Technology researcher to dream up *software agents*. For Selfridge, an agent should resemble a valued assistant with which one can communicate in a kind of shorthand and rely on its sense of responsibility to get the job done.

So far, Selfridge's dream hasn't been fully realized. The virtues that Selfridge thought an agent should have—super intelligence, self-motivation, and loyalty—are not yet found in software agents.

Nonetheless, through a combination of wishful thinking and marketing cunning, the term agent is being applied to a broad range of manifestations: from simple adaptable interfaces to sophisticated self-modifying program objects that can do your shopping.

"Lately, the word agent is used any time PC users think some personality in their computer is doing something for them," explains Ted Selker, a lecturer at Stanford University who teaches the course "Proactive and Reactive Agents in User Interfaces."

Selker's interest in agents dates back to graduate school when he created his first agent—Coach, shorthand for *cognitive adaptive help*—for his PhD thesis. In the mid-1980s, he contributed to Atari's research effort into intelligent encyclopedias and video games, the precursors of today's multimedia software.

How smart are these so-called agents? Selker rates agent intelligence on a continuum from preprogrammed macros to human-faced personalities on screen (see "New Faces in Interfaces" on page 170). You'll find clever programming and lots of human ingenuity in each agent, but currently there isn't enough problem-solving intelligence. A truly intelligent agent should be capable of original thinking, giving it the ability to solve problems independently.

For example, it should adapt to changing circumstances by coming up with an alternate plan of attack.

The leading software vendors boast of "artificial intelligence" for largely cosmetic features, like menu bars, icons, smart help, and even tutorial videos. Still, when learning to use a program costs more in lost productivity than the software price itself, it's hard to resist even the illusory promise of PC intelligence.

## IS TODAY'S SOFTWARE SMART?

Consider this: Lotus successfully packages its combined applications (1-2-3 for Windows, Ami Pro, Freelance Graphics, Lotus Organizer, and Approach) as its SmartSuite. But don't look for breakthrough artificial intelligence here. All of the programs include SmartIcons, which are really no more intelligent than icons that launch Windows applications via macros. Their smartness refers to the fact that they are consistent across Lotus applications.

By the next version of SmartSuite, each program will include the ScreenCam screen-recorder utility, which debuted last November in Lotus 1-2-3 Release 4 for Windows. About as smart as a camcorder, ScreenCam records program screens, mouse and cursor movements, menu selections, and audio. These live-action screen captures can be used to create quick custom tutorials to train users how to do something correctly—how to generate an invoice in Approach, for example. In the absence of built-in or third-party tutorials, ScreenCam is a savvy feature only if a systems manager or network administrator has the smarts to create onscreen lessons.

While ScreenCam sounds like something TV's David Letterman would skewer, it does demonstrate the need for more imaginative ways to teach people how to master their software. "Anything that makes computers less forbidding involves intelligence," insists Alex Morrow, general manager of systems architecture at Lotus. By accelerating the learning curve, even the dumbest tutorial can boost human intelligence. "Showing things as animated examples reassures

*"Agent, I can't afford to be bothered with junk mail. Get rid of it."*

**Smart mail:** The Desk in General Magic's Magic Cap software program is command central for all of your communications.



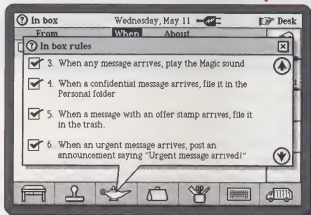
**Assign task:** Create an agent to keep your in-box from becoming clogged with junk mail.



new users that tasks can be accomplished," Morrow adds.

Another example of simple tutorials that save time, Coaches were introduced in WordPerfect 6.0 for DOS and Windows. "The idea is not to ask the computer to do things for you, but just to show you how," says Dave LeFevre, product manager for WordPerfect. Coaches are canned walk-throughs of multistep tasks such as mail merges. Although they don't adapt to the individual user's work habits or situation, Coaches provide an interactive experience that prompts users to input data, acts on the input, and walks the user to the next step.

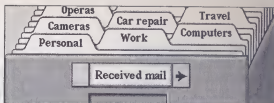
To call up a Coach in WordPerfect, you click on an icon with a cartoon profile of a football coach, then select from among 12 esoteric tasks, such as creating labels or footnotes. While LeFevre admits that today's Coaches are little more than well-designed macros, they won't always be this limited. "Within a year or two, you'll see active agents in WordPerfect, so tasks in software will be simplified."



**Background operation:** Set rules for the agent's behavior. Tell it to notify you with text and sounds if an urgent message arrives, or to throw a junk mail message in the trash.

The next version of WordPerfect will have what LeFevre refers to as *morphological capabilities*. This means it will be able to break down sentences and search for syntactical elements as you input text. For example, future agents will recognize incorrect verb forms and correct them in real time. "Your software will show you what you're doing that is grammatically incorrect and suggest corrections or automatically do them for you," says LeFevre. After this technology was in development for more than three years at WordPerfect, efforts were accelerated by the purchase of Reference Software International, a leader in dictionary and lexical software.

If LeFevre is right, by 1996 your word processor will be able to diagram a sentence about as well as any



**Task complete:** An e-mail message in your work folder might even contain voice annotation.



**Agent working:** The agent follows these rules, filing your urgent messages in the appropriate folders, and trashing the junk mail.

substitute teacher can, totally recasting the sentence order if necessary. Maybe substitute teachers won't diagram sentences anymore, since PCs will do it for them. Still, syntactical understanding doesn't include the common sense needed to properly interpret the various meanings words convey. Efforts are under way to impart common sense to PC software, but intelligence on a

par with a human personal assistant will probably have to wait until the next generation of PCs arrives (see "Computing Common Sense" on page 165).

## HELP! SMART HELP!

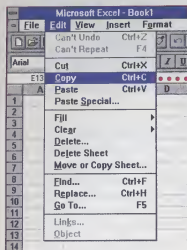
A peek into the future of automated help came last October at a big bash in New York, when Microsoft Chairman and CEO Bill Gates unveiled Microsoft Office Version 4 for Windows, an application suite that includes Excel 5.0, Power Point 4.0, and Word 6.0. Gates also announced Microsoft's new IntelliSense technology. IntelliSense is a grab bag of Microsoft's automated tutorials (Wizards), context-sensitive help, automated formatting, and spelling correction. But with agents sure to become a major battleground for competing software developers, Microsoft is giving itself a migration path from Wizards to more powerful agents.

Chris Peters, vice president of Microsoft's Office Business Unit, is credited with coining the term IntelliSense. He explains, "IntelliSense is everything from simple artificial intelligence [AI] to powerful AI that delegates tasks to your computer. It can turn 100 steps into 5 steps." Or automatically correct errors.

In its product launch for Office Version 4, Microsoft stressed that each of the 100 most common tasks users perform with Office can now be accomplished in a single step. In some cases, IntelliSense means automatic execution of common correction and formatting functions, while in others, IntelliSense guides the user through complicated tasks such as programming with macro languages.

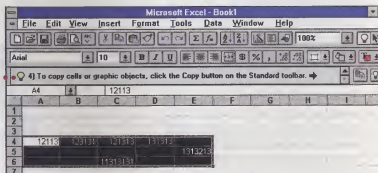
More often than not, Office's IntelliSense involves a Wizard. "A Wizard actually does a task for the user," says Peters. Wizards first appeared in Excel 4.0 as dialog boxes that walked you through the steps required





**Keep working:** Copy and paste your data as you would normally do.

*“Sometimes I don’t know when I need help.”*



**The wizard speaks:** Excel’s TipWizard continually monitors your actions and offers a new tip to help you copy or paste your data more efficiently.

to perform a task, much like WordPerfect’s Coaches. In Excel 5.0, the FunctionWizard alone provides help for 200 worksheet functions. Activated whenever you load a text file, the Text Import Wizard offers counsel on formatting. Most of these Wizards are easily summoned by clicking on an icon bearing a Wizard’s wand.

“You have a sense of accomplishment when you get a Wizard to complete a task by pushing its Finish button,” Peters points out. In Excel 5.0, that might be the new PivotTable Wizard, walking you through the steps for pivoting chart data to create alternate data. In Word 6.0, the AutoFormat Wizard scans a document and makes it look nicer by automatically replacing common eyesores. For example, asterisks used for bullet points are replaced by dingbats, and straight quotation marks are replaced by curly ones. PowerPoint’s AutoContent Wizard prompts you through your choice of six generic business presentation types, which are meant to inspire creativity while you’re producing your own presentation.

Microsoft has taken Wizards a step further with IntelliSense Wizards. Lurking in the background of your Office Version 4 applications, TipWizards are activated when they notice a task that could be performed more efficiently. When this happens, the lightbulb on the TipWizard icon bar turns yellow. Click on the icon and the shortcut comes up. As intelligent as they sound, TipWizards are essentially just clever built-in macro commands. With more than 1,000 of these in Excel 5.0 alone, you get a feeling of security from being watched over by an army of software magicians.

Since Microsoft is the industry leader in suites and office applications, its commitment to IntelliSense provides a big target for competing software publishers. “Our spreadsheet is smarter,” Daniel Rosenberg, user

interface architect for Borland, says about Quattro Pro 5.0 for Windows. “We have simple learning algorithms built in to the program, like the Intelligent Graph feature.” Depending on the amount of data to be displayed, this subroutine tries to pick out an appropriate chart style for you without requiring your input.

Quattro Pro 5.0 also features Borland’s answer to Microsoft Wizards: Experts. Like Wizards, Experts guide you through complex tasks. For example, the Analysis Expert offers you lists of spreadsheet analysis choices, then follows through with the analysis once you have entered the selected data. The term Experts brings to mind the expert systems in artificial intelligence research, such as sophisticated programs that consistently provide medical diagnoses—based on interviews with medical experts—that are better than the diagnoses by attending physicians. But Borland’s Experts are far less intelligent. Rosenberg admits that “Experts and Wizards don’t do real, intelligent processing. Neither really works for you or advises you on better results.”

In the pending release of Lotus Approach 3.0 for Windows, Lotus also responds to Microsoft’s Wizards with its own software helpers, called Assistants. These will eventually show up in all Lotus SmartSuite programs. A Lotus product manager explains, “With our Assistants, you can go back and change parameters if you’re not happy with the results. With Wizards, once you push the Finish button, you can’t backtrack.”

With the availability of adaptable scripting languages, we can begin to create “the electronic assistant for the rest of us.” Smart software can be programmed to incorporate



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truly autonomous agents to interact with data and events on other systems—to access external databases, exchange correspondence, and route documents for review.

### THE BUTLER DID IT

"To have software agents, at the very least you need the ability to schedule events, either by time or by a triggering action, and to script actions for the agent," explains Leon Navickas, general manager for the Lotus Notes research and development effort. "It's no secret that Lotus is working on this for the next version of Lotus Notes, Release 4."

For anyone who has ever dabbled with a macro language to access and search a remote information service or to monitor e-mail, the prospect of using a scripting language shouldn't be daunting. "We'll make things a lot easier for end users," Navickas says. For starters, Notes will finally support the full functionality of the rules in Lotus' own e-mail package, cc:Mail. "There's little opportunity for mistakes because the scripting is very context-driven. It's very easy to write a script to filter out junk e-mail messages."

The e-mail or fax butler—hip to the difference between junk communications and career-essential data, fastidious about cleaning out your telecommunications files without being asked—is today's recurring office fantasy for smart software. Is it just a dream? Or is e-mail screening the killer app that will make smart PC software a necessity?

### COMPUTING COMMON SENSE

Faster microprocessors, more main memory, and larger hard disks are being used to impart computers with the basic real-world knowledge that most people acquire during childhood.

Since 1984, Douglas Lenat, principal scientist and director of Microelectronics and Computer Technology, has led the Cyc Project, organizing the 4 million assertions (such as "a child can't be older than its parents") needed to understand entries in an encyclopedia. By 1995, Lenat expects to have a "knowledge base able to support common sense" that occupies 200MB.

Meanwhile, since 1991, Microsoft's Natural Language Processing Group has been building relationships between the definitions and phrases of the 75,000 words in *The Langman Dictionary of Contemporary English*. Consider similar sentences with different meanings: "I saw the pelican with a telescope," and "I saw the pelican with a feather missing." In this case, Microsoft's software finds a relationship between *telescope* and the act of seeing, and discovers that *feather* applies to the pelican. "It takes about a half-second to do such an analysis with a 486-based computer," says Chris Peters, vice president of Microsoft's Office Business Unit. Peters predicts that a 128MB Microsoft knowledge base will be ready by 1996, and that next-generation PCs will perform sentence analysis in less than a tenth of a second—fast enough for use in common applications.



In the wake of software giants Microsoft and Lotus, which combined sell the vast majority of e-mail software, at least one company has staked its future on claims of a smarter scripting language. Beyond Inc., a firm specializing in e-mail software, is tied to the success of its core product, BeyondMail—which it calls "a next-generation rule-based electronic mail system." More than a clever hack, BeyondMail was inspired by research at the M.I.T. Sloan School of Management on the Information Lens, a way of sorting online data so managers won't be flooded by an information glut. According to Eugene Lee, Beyond's vice president for product planning, BeyondMail offers custom forms and a rule engine so that you can write applications relating the real world to a script.

BeyondMail is not quite an e-mail butler, but its sophisticated scripting language gives you the tools you need to create the butler. Users can program agents to perform desired actions in background mode. With add-on products like the Beyond Notes Connection for enhanced access to Lotus Notes, WinRules for links to Microsoft Mail, and PowerRules for Macintosh applications, Beyond has a window of opportunity to convince users that e-mail is more than just messaging.

Other companies have also settled on the Notes desktop as the platform from which to launch agents with more than their share of smarts. SandPoint's Hoover is one example. Says Mike Kinkad, SandPoint president and CEO, "A software agent retrieving information on the Internet for you can already act as intelligently as an office clerk, although certainly a lot less intelligently than a good executive secretary."

By many accounts, Hoover is the best agent-based software to be offered commercially for PCs. SandPoint describes its leading-edge product as an active information agent that can search, retrieve, and integrate information from multiple external sources. Hoover, like the vacuum cleaner or the FBI's J. Edgar, knows how to dig out dirt. Hoover queries online data services, parses the information it finds there, and delivers it in a neatly formatted briefing document to the Notes desktop.

SandPoint's stock-in-trade, it turns out, isn't its impressive software, but an information republishing business. "Hoover redistributes data from 40 online publishers," says Kinkad. Among its popular real-time computerized publishing services: NewsAlert, which monitors trends and topics on the leading news wires, and *The Wall Street Journal*, which provides full-text electronic



delivery of the daily national business newspaper into a Notes database which Hoover then parses.

At a monthly fee of \$233 per user, Hoover can be a high-priced luxury for enterprises trying to scale down expenses. SandPoint's Kinkead argues that the service pays for itself by saving time and effort in gathering current information for business planning. Still, he warns, "Agents are at a new, very early stage of development." As with other burgeoning institutions on the Information Superhighway, let the user beware.

While Hoover concentrates on gathering data from external sources, Trinzic's Forest & Trees software for Lotus Notes specializes in agent-based gathering of information from internal company databases. Product Manager Brad Haigis calls Forest & Trees "desktop decision support or executive system-analysis software." Among its powers, Forest & Trees can gather information from 25 mainframe and PC database formats on a regular basis, applying alarms and triggers if the data falls outside a preprogrammed range.

According to Haigis, a major Midwest-ern manufacturing company monitors its parts inventory with Forest & Trees, automatically placing reorders whenever inventory falls below preassigned limits: "We've shortened the reaction time for companies in fast-changing industries," asserts Haigis. The usefulness of this kind of data pump is limited only by the ease of its user interface.

The pedigree of two of General Magic's founders, Bill Atkinson and Andy Hertzfeld—who helped design the first Macintosh computer more than ten years ago—assured the company's January announcement of agent-based technology the widest press coverage to date of a still-esoteric area of computer science. The emphasis on agents that shop for your Mother's Day flowers via an AT&T network called PersonaLink made for jovial copy in the pages of *The Wall Street Journal* and *Business Week*, but General Magic is seeking a serious role as the standard programming medium for agents on the Internet.

"Our agents are not intelligent, but they are programmable," says George Fan, product manager for the Telescript language.

Telescript is at the heart of General Magic's Magic Cap interface for "the handheld desktop of tomorrow"—a technology that could turn out to be less important than Telescript itself. According to Fan, "One definition of an agent is a remote mobile program helping manage flow and routing of messages. Telescript provides the remote programming architecture to make this possible." Among the functions it defines for an agent: a unique security code used for authentication, authority to charge items to your account up to a specified amount, and even specification of an agent's life span and date of demise, so cyberspace won't become overpopulated with out-of-date agents.

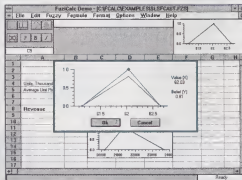
"One person can have several agents, and an agent can create other agents," Fan observes. Telescript's authentication and life span limits for agents are essential to avoid the kind of mutation that could turn into a disastrous virus on the interlinked world of the

## FUZZY LOGIC

Applications generally embody black-or-white choices bound by rigid logic, not real-world, shades-of-gray problems. To get smarter, software has to accommodate fuzzy thinking, the adoptive reasoning that people use.

FuziWare proclaims its FuziCalc product "the world's first fuzzy spreadsheet." Instead of having you recalculate numerous what-if scenarios with precise values for estimates or forecasts, this innovative spreadsheet works with approximations. FuziCalc allows you to consider wide ranges of possibilities by specifying the numerical value for a cell with an absolute minimum, absolute maximum, and likely range—even with existing data files.

A verbal application of fuzzy logic can be found in Quattro Pro Presentation Advisor from Borland. Smart help screens offer sliders with a range of choices for selection criteria instead of mutually exclusive either/or radio buttons. In the Slide Template Advisor, you can select ranges for five categories of effects, including Informal to Formal, and the Advisor will suggest an appropriate presentation style. Each slider bar embodies a continuum of seven possible



**Message data:** FuziWare's FuziCalc performs calculations with imprecise or "fuzzy" data.

values for easy adjustment. When coupled with the media to be used and the presentation environment, sometimes these choices evoke too many contradictory needs and no solution is found—a sure indication of intelligence rather than canned responses. "You get the equivalent of a good graphic designer, but not a genius," says Daniel Rosenberg, user interface architect at Borland.



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Internet—a concern that's been raised by many critics.

The new scripting languages are enhanced versions of communications software and database scripts that automate recurring tasks. The future of agents really lies along the lines of software that learns from

observing a user's patterns. By developing a user profile, an agent can learn to anticipate the user's needs.

It's easy to get paranoid about smart PC software that can learn about a user, discern patterns and tasks amidst the keystrokes, anticipate needs, and offer advice for productivity gains. Stanford's Ted Selker calls these entities *proactive agents* because they decide to do something without your asking for it. "Before you press a mouse button, proactive agents will tell you what you need by virtue of the relationship between user and agent."

One such proactive agent is Computer Associates' personal finance program, Kiplinger's CA-Simply Money for Windows. The software includes a background Advisor that monitors personal financial transactions and offers pointers when it discerns patterns in your bill paying and other fiscal activities.

Another proactive agent, Open Sesame from Charles River Analytics,

## NEW FACES IN INTERFACES

Software designers are about to louch megabytes of onscreen mugs sa applications will appear wiser and friendlier. Help is already provided by half-human, half-animal characters in kids' programs such as Broderbund's "Arthur's Teacher Trouble" and "Just Grandma and Me" CD-ROM storybooks. And cartoonish human faces show up in icons for business applications like Barland's Quattro Pro spreadsheet.

With video-quality animated faces soon to appear on PCs, their implementation will be of critical importance. "It's uncanny how the human brain is designed for interacting with human faces and how emotional the response can be," says Chris Peters, vice president of Microsoft's Office Business Unit. For instance, Peters notes that "The more realistic the face, the more intelligent you expect it to be. . . . A face should avert its gaze after a while so the user won't feel uncomfortable." Computer-generated people should have manners, too.



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is a more general-purpose program. Currently available for Macintosh computers only, it uses a neural network (a pattern of logic connections inspired by the structure of brain cells), and expert systems techniques from artificial intelligence. Open Sesame compares high-level events, like opening a file folder, with low-level events, like the keystrokes typical of the user's tasks. If it finds a pattern, it automatically proposes a way to automate the recurring series of keystrokes without the user having to create a macro manually. It will save time because users will be able to launch an elaborate string of actions with a simple command.

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sophisticated macros and enable the computer to understand natural language commands.

How smart will your PC software get? With all of this ongoing development activity, need anyone ask? 

*Steve Ditlea is a freelance writer who has been covering the PC industry since 1978.*

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# Decoding DoubleSpace

**First data corruption, then application incompatibilities, now a \$120-million lawsuit. Is DoubleSpace safe to use? By Brian Livingston**

**D**oubleSpace's on-the-fly disk compression was MS-DOS 6's biggest selling point. Unfortunately, it quickly became the Achilles' heel when reports from users indicated that it intermittently corrupted files and didn't work with some applications. You can find some specific instances, and the fixes that Microsoft made

to DoubleSpace in DOS 6.2, in "DoubleSpace, Then and Now," on page 176.

Now, Stac Electronics has won a \$120-million lawsuit against Microsoft for infringing on Stac's compression patents. Part of the result of this lawsuit is that Microsoft will release DOS 6.21—without DoubleSpace. This is probably for the best, considering that even DOS 6.2 hadn't fixed DoubleSpace. That's right: It's still not safe, and if you have it, you should think twice about using it.

**Installation failures.** Installing DoubleSpace and compressing a disk drive is an uncertain process if a PC is running virus-checking software, a delete-tracking utility, a screen saver, or a disk cache other than Microsoft's SmartDrive.

For example, according to an internal Microsoft technical support document, if you are running a screen saver, the following message is likely to appear:

"DoubleSpace cannot defragment C: because of an unknown error." Of course, this has nothing to do with defragmenting the C: drive. Simply comment out the screen saver (and other memory-resident programs), reboot, and then try the installation again.

**Application incompatibilities.** Many programs, due to their design, will not work properly when you store them on DoubleSpace-compressed drives. Among them are Lotus 1-2-3 Release 2.01, MultiMate 3.3 and 4.0, Complete PC audio software files, the Informix relational database, ZSoft PhotoFinish, and all versions of Quicken for DOS. Many of these programs compress and decompress files on the fly and, in doing so, conflict with DoubleSpace. In addition, some games and other programs conflict with DBLSPACE.BIN, the DoubleSpace driver that loads prior to CONFIG.SYS.

If you're using DOS 6.2, you can avoid this driver conflict by *clean booting* (pressing Ctrl-F5). Doing this will prevent DoubleSpace, CONFIG.SYS, and AUTOEXEC.BAT from loading. You can then run your game or other program.

**Permanent hibernation.** Many PCs, especially portables, support a hibernation mode: You can shut off such machines, then return later with your programs still in the same state. But with DoubleSpace installed, when your machine enters hibernation mode, the PC may not be able to recover when you try to wake it up. This happens because DoubleSpace is not loaded when the PC tries to read its hibernation file off the DoubleSpace-compressed drive. The cure for this problem is to install a version of DOS from the PC's manufacturer—Compaq DOS 6.2 for a Compaq LTE, for example. These OEM DOS versions contain the support code necessary for hibernation.

**CONFIG.SYS and AUTOEXEC.BAT pitfalls.** If your programs install new lines in CONFIG.SYS, and the lines appear after the DBLSPACE.SYS line (which relocates the DoubleSpace driver in memory), serious troubles may arise. For example, loading the Iomega Bernoulli driver, RCD.SYS, after loading DBLSPACE.SYS causes DOS to discard the RCD driver and makes the Bernoulli drives unreadable. Other commands that have problems when they're loaded after DBLSPACE.SYS include the Backup device driver BACKPACK.SYS, SCSI drivers such as SCSI.SYS, and disk-partitioning software such as Storage Dimensions' SSTOR.SYS.

Additional confusion about the SSTOR.SYS driver occurs because DOS 6.2 includes a copy of SSTOR.SYS, but

DBLSPACE/LIST				
Drive	Type	Total Free	Total Size	OVF Filename
A	Floppy drive	9.47 MB	9.79 MB	
C	Compressed hard drive	71.65 MB	368.24 MB	E:\DBLSPACE.BIN
B	Available for DoubleSpace			
E	Local hard drive	3.23 MB	232.49 MB	

DoubleGuard safety checking is enabled.  
Autounmounting is disabled for all drives.

Get a quick overview of your DoubleSpace configuration by typing DBLSPACE/LIST at any prompt. This is especially handy when you need to identify the host drive ("Local hard drive") letter on a system other than your own. It will also tell you how much free space you have left.



# in DOS 6.2

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it is not compatible with DoubleSpace. Users need to get a different version by calling Storage Dimensions at (408) 954-0710, ext. 331.

Another potential problem product is a third-party disk partitioning program called Ontrack Disk Manager. DOS 6.2 includes an updated copy of DMDRVR.BIN to take care of the problems with Ontrack. But creating a new DoubleSpace compressed drive with DMDRVD.BIN loaded can make it look

as if the data you just compressed has disappeared. This takes place if the DMDRVR.BIN line in CONFIG.SYS appears *before* the command SMARTDRV /DOUBLE\_BUFFER. Reversing the order of these two lines and rebooting will fix the problem.

Hard drives that require a device driver in CONFIG.SYS present a whole class of special cases for DoubleSpace. DoubleSpace may not recognize compressed drives that rely on their own

device drivers. Hardcard drives, formerly distributed by Plus Development, are an example. New compressed drives created on these devices require you to insert a DBLSPACE /MOUNT command in your AUTOEXEC.BAT file. According to Microsoft, you must also make sure that CONFIG.SYS loads at least one unrelated device driver, such as ANSI.SYS, *after* the Hardcard driver and *before* the DBLSPACE.SYS line.

Situations involving removable hard

## HOW DOUBLEGUARD PROTECTS

1. When DoubleSpace receives a command to copy data to a compressed drive (such as C:), DoubleGuard (DOS 6.2's guardian against memory corruption for DoubleSpace) checks to ensure that DoubleSpace is still alive and well in RAM. If the memory is damaged by an errant application, the system halts with an error message. You can't use the computer, but it's better to have to reboot than to unknowingly write corrupted data.

2. If DoubleGuard detects no memory errors, DoubleSpace compresses the data and writes it to the target drive. The time delay for this memory check is minimal, and the trouble it can save is immeasurable.





## DOUBLESPEACE, THEN AND NOW

DOS 6's DoubleSpace had problems. Here's a comparison of how DOS 6.2 deals with two of the worst bugs from the earlier version:

**Memory integrity.** DoubleSpace in DOS 6 didn't check the integrity of its memory space before writing files to a compressed drive. Because of this, DoubleSpace couldn't ensure that another program hadn't corrupted the areas that DoubleSpace inhabited in memory. If these areas were corrupt, DoubleSpace wrote erroneous data when saving files.

A new feature called DoubleGuard protects DoubleSpace in DOS 6.2. If DoubleGuard detects changes in DoubleSpace's memory areas, it immediately halts your PC. This protects your disk, but it's also a giant pain because you have no chance to print or even finish looking at any unsaved data files. You must reboot your PC, losing any files you haven't saved.

**Fragmented and full disks.** Other problems arose when DOS 6's DoubleSpace tried to write files to a drive that was heavily fragmented or nearly filled. In the most serious of these cases, DoubleSpace would write a file to a compressed drive,

reporting no errors. But the file that had just been written was, in fact, corrupted because DoubleSpace wrote intermittent NUL characters (ASCII character 00) in the file.

Microsoft seems to have removed this bug from the DoubleSpace code in DOS 6.2.

```
C:\DOS>DBLSPACE/UNCOMPRESS C:
```

```
DoubleSpace cannot uncompress drive C
because there is not enough space on
drive E to hold all of the uncompressed
files.
```

```
To uncompress drive C, you must remove
at least 186,184,784 bytes of files from
either drive.
```

"The repeatable problems are gone," says Allen Feuer, director of software development for Blossom Software, and creator of DoubleCheck, a diagnostic utility that tested DoubleSpace volumes for this behavior.

drives compressed with DoubleSpace and special drivers in CONFIG.SYS are particularly sensitive to the addition of other CONFIG.SYS lines. Adding a RAMDRIVE.SYS line, for example, causes the DoubleSpace volume on a removable hard drive to "disappear" if you insert the RAMDRIVE line before the hard drive device line. To correct this, you must move the RAMDRIVE line to a point after the hard drive device line. If the problem came from deleting a RAMDRIVE line, you must run the DoubleSpace configuration program and choose Mount from the menu. This allows DoubleSpace to rewrite its drive letter assignments.

**Conflicts with other DOS 6.2 programs.** DoubleSpace works by storing the entire contents of a compressed drive (such as C:) in a single, giant file on a phantom host drive. Since this file is crucial to the health of your data, it should remain Hidden and Read-Only

to protect it. However, if you load the DOS 6.x Fastopen utility (which improves directory-reading performance), and then run CHKDSK on a DoubleSpace drive, the giant file immediately loses its Hidden and Read-Only attributes. You receive no warning message at this point, but any program can now delete or modify your critical compressed file. Since many DOS 6.2 utilities don't integrate well with Fastopen, I recommend that you never load Fastopen. The small performance improvement just isn't worth the risk.

SUBST is another DOS 6.2 utility that works rather poorly with DoubleSpace. Microsoft recommends using SUBST to create substitute names for long paths, rather than the troublesome ASSIGN command, which Microsoft left out of DOS 6.2. (For example, you could create E:\ as a substitute for C:\BACKUP\PROGRAMS, which helps keep your path short.) But while you can create

substituted names just fine, you cannot delete them properly if DoubleSpace is running. A command like SUBST E:/D would appear to work, but diagnostic programs such as Microsoft System Diagnostics (MSD) still show drive E: as valid. Attempts to change to drive E: result in the message, "Error reading drive E:" instead of the expected message, "Invalid drive specification." This occurs because DoubleSpace reserves four drive letters when it loads, even if it uses only one drive letter for a compressed drive. A SUBST command that involves any of these "free" DoubleSpace drive letters produces this strange error message.

**Third-party hang-ups.** There is a high risk of data loss when using disk-utility programs (optimizers and the like) that developers have not specifically updated for DOS 6.2 DoubleSpace. Microsoft states in an internal technical support document that using the Clear Unused Disk Space options in Speed Disk in any version of the Norton Utilities earlier than Version 7.0, and in PC Tools 6.0 and earlier, results in a large number of lost clusters. If you write to a DoubleSpace drive with the PC Tools 6.0 shell program, the drive may become corrupted. Exercise extreme caution in using disk utilities whose publishers do not specifically state that they are safe with DOS 6.2 DoubleSpace.

DOS 6.2 DoubleSpace is not compatible with DoubleDisk Gold 6.0 or Space Manager 1.5 for DOS 6. Both are compression-enhancement products published by Vertisoft Systems (the original developers of the DoubleSpace code that Microsoft purchased) and promoted for DOS 6 use. If you use either of these products, you need to upgrade to newer versions.

If you use a Bernoulli drive with the DOS40A.SYS driver, your compressed drive C: may seem to disappear for no apparent reason, according to Microsoft. If this occurs, you will be able to view on drive C: only the files on the DoubleSpace host (noncompressed) drive letter. Unfortunately, the only way to avoid this situation is to reboot.

Starting the DoubleSpace configuration program while Traveling Software's LapLink III device driver (DD.EXE) is

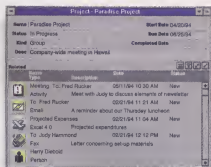


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loaded causes DoubleSpace to appear to freeze. There is no response on the screen or when pressing keys. Your PC only appears to be frozen, however. If you wait long enough (from five to ten minutes, Microsoft officials suggest), DoubleSpace begins to work again.

**Decompressing pitfalls.** If you need to decompress a DoubleSpace volume in DOS 6.2, the process may fail. You'll see a Duplicate filename message if there are files with the same name on both the compressed drive letter and the drive letter you are decompressing to. Finding these files can be a real pain, especially if they are marked Hidden.

Decompressing a DoubleSpace volume that contains files locked with password-security programs (Microsoft cites Micah Development's Full Armor program as an example) results in the total loss of the locked data. Therefore, users must always remember to first "unlock" the data by decrypting the files before using DoubleSpace to decompress a volume.

**Resizing DoubleSpace drives.** If you need to resize a DoubleSpace drive, the procedure will fail if a file

```
C:\>DBLSPACE/RATIO=2.4
DoubleSpace is examining drive C.
DoubleSpace is changing the compression ratio of drive C.
DoubleSpace is remounting drive C.
The estimated compression ratio of drive C has been changed.
```

If you mainly save text, bitmap, and other high compression-ratio files, you may have more disk space than DoubleSpace reports. Use DBLSPACE/RATIO to set a new compression ratio estimate.

is stored in the last cluster of the DoubleSpace volume. Here's why: Delete-tracking programs, such as DOS Mirror, use the last cluster to store hidden files. DoubleSpace sees the hidden files there and thinks that its volume is fragmented, so it displays a message saying that the volume is too fragmented to resize, and recommends using the DOS DEFRAG program. However, using this program won't cure the problem—the hidden files will still be at the end of the DoubleSpace volume. What you need to do is temporarily move the file away from the end of the DoubleSpace volume. (Consult the documentation that came with your delete-tracking software if you need help in doing this.)

**PS/1 problems.** Installing DoubleSpace on one of the many PCs that boot DOS from ROM, such as the IBM PS/1 and numerous laptops, creates another whole class of interesting troubleshooting opportunities. On these machines, DOS boots from ROM before the DoubleSpace driver loads. Therefore, all the data you carefully compressed with DoubleSpace before rebooting has suddenly disappeared. IBM provides a program called CUSTOMIZ with the PS/1 that lets you switch from booting up from ROM to booting up from the C: drive.

However, if you compressed your C: drive, this program is now compressed also, and thus unavailable. To work around this, choose System from the ROM start-up menu, then press Alt-Print Screen and then F1 to execute a one-time-only boot-up from the C: drive. Once this boot-up occurs, DoubleSpace loads and you can run CUSTOMIZ to make future boot-ups occur from drives A: and C:, instead of from ROM.

**The suit.** You may not need to worry about these problems for long, though: Thanks to the court ruling I mentioned at the start of this article, Microsoft must remove DoubleSpace from DOS. According to the ruling, Microsoft infringed on the patent for a compression algorithm held by Stac Electronics (maker of Stacker, the popular compression program).

At the time of this writing, Microsoft has not determined how extensively they're going to try to eliminate DoubleSpace. A new version of DOS—6.21—will be out soon—minus DoubleSpace. However, it's not clear whether Microsoft will be recalling DOS 6.2 or offering free upgrades. As I find out more, I'll keep you posted. ■

Brian Livingston is the author of *Windows 3.1 Secrets*, *Windows Gizmos*, and *More Windows Secrets* (IDG Books).

## CONVERTING STACKER VOLUMES

One of the extras you could get for DOS 6.2 was a Conversion Disk for Users of Stacker, which enabled you to convert a Stacker-compressed drive into DoubleSpace. Even if Microsoft hadn't lost the lawsuit with Stac (see "The suit," at right), performing this conversion might not have been a good idea. Here are the four top problems with the conversion process:

**Cluster size incompatibilities.** You can't convert data compressed in Stacker 2.0 and 3.0 formats to DoubleSpace format unless the data uses 8KB clusters. Stacker 3.0 supports cluster sizes of 4KB, 8KB, 16KB, and 32KB, while Stacker 2.0 supports only the 4KB and 8KB cluster sizes.

**Reversed drive letters.** Stacker-compressed removable drives that have been converted to DoubleSpace drives exhibit "host" and "compressed" drive letters that appear to be reversed. You need to correct the drive letters using the DBLSPACE /HOST command. Type DBLSPACE /? to find out how.

**Path too long.** Due to DOS's 127-character path limitation, if your path contains more than 127 characters, DOS 6.2 instructs you to add the DOS directory or the STACKER directory to your path. In fact, you should just shorten your path statement (making it include both the DOS and STACKER directories) and reboot.

**Step-Up and Stacker.** If you try to install the DOS 6.2 Upgrade or Step-Up on a system running Stacker 3.1.1, the install program halts and displays recommendations that do not correct the problem. At this point, you need to run the Uninstall disk that DOS 6.2 created at install. The problem occurs because DOS 6.2's install routine queries for Stacker 3.1.0, and halts when it receives any later version. 62STAC.EXE temporarily makes Stacker 3.1.1 report that it is Version 3.1.0. [Stacker 3.1.1 comes in Stacker 3.1 packaging, but can be identified by its files' time stamp, 3:11 a.m.] With problems of this severity, it's difficult to recommend that anyone undertake the conversion—certainly not without a full system backup.



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Microsoft At Work™ fax technology and super-fast networking that works with Novell® NetWare®, Windows NT™ and other standards, Windows for Workgroups 3.11 is an essential upgrade for any Windows 3.1 user. But there's only one way to experience this speed and power. Drive it.

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\*Performance figures may vary depending on configuration. ZiB Data WinBench™ speed tests were average performance runs (100 being baseline avg.) based on a Zenith Znoor 425 Lnp+Intel 80386-based computer and an 80486-based computer (both uncompressed and compressed disk volumes used) with 6MB RAM, 200MB hard disk 312 cache and IDE disk controller. Test was run using MS-DOS 6.2. Test site verified by ZiB Data. © 1994 Microsoft Corporation. All rights reserved. Microsoft and MS-DOS are registered trademarks and Windows, Windows NT and Microsoft At Work are trademarks of Microsoft Corporation. Novell and NetWare are registered trademarks of Novell Corp. In the 50 United States, call (800) 426-9400. Customers in Canada, call (800) 563-9048. Outside the 50 United States and Canada, call your local Microsoft subsidiary or (206) 936-8661.



# The Sound without the Fury: Tips for Installing a Sound Card

Plugging in a sound card is easy. Getting it to sing is a different story.

**W**alk down a typical office hallway—it'll probably sound like a video arcade at least part of the time. No, it's not a sign that the American workforce is getting hipper. It's because, for better or worse, sound cards have become standard issue on even the most basic desktop PCs. Today they enable your PC

to play music, make great presentations, and effectively grab your attention when there's something wrong. And, of course, they let you play games. Tomorrow, they'll enable a new breed of voice-driven applications and probably make the integration of telephone and computer a reality. And, of course, they'll let you play even better games.

The care and feeding of a sound card can be something of a black art. Don't get lost in unfamiliar territory; check out the following non-nonsense sound advice, where we tackle some of the most common sound-related problems.

## Attach Sounds to Events

Are you sure you want to? That Beavis and Butt-head sound clip might be fun the first time, but after a week or two

the novelty wears thin—for you and for everyone within earshot.

Still, some Windows system events benefit from the judicious application of a sound clip. For example, you can replace the default beep with a louder, more distinctive sound—that way you'll get unmistakable feedback when it's time to swap disks during a lengthy installation.

To attach sounds to system events, open the Control Panel and double-click on the Sound icon. System events are listed on the left side of the dialog, available WAV files on the right. By default, the dialog lists only WAV files in the Windows directory, but you can browse through other directories in search of sound clips, too. Highlight the system event and a matching sound clip, then click on the Test button to preview the sound. Make sure the Enable System Sounds box is checked and press OK.

If you want to work in peace and quiet, deselect the Enable System Sounds box. Be aware that two system events—Windows Start and Windows Exit—play their attached WAV sounds regardless of the status of that checkbox. To turn off those two sounds, you must associate them with the <none> option.

## Play a Music CD

Do you have a 16-bit sound card (8-bit sound cards don't sound as good) and external speakers? Do you have a CD-ROM drive? Does the CD-ROM drive support audio CDs? If the answer to all three questions is yes, you should have no problem making your PC compatible with any music CD.

If it's not already installed, you'll need to add the Media Control Interface (MCI) CD Audio driver. First, put

## WIN APP OF THE MONTH



### HyperCD

From Bach to Pink Floyd: Play your favorite music on your CD-ROM drive with HyperCD, a free CD player applet that uses fewer resources than the Windows 3.1 Media Player. HyperCD anchors itself to the bottom right corner of your screen, so it will always be there when you want to pause or eject a CD. Download HYPRCD.ZIP from PC/Contact's dotto library 3 (Utilities/Misc.) or see page 185 for instructions on ordering the disk from Public Broad Software.

PCContact

an audio CD into the CD-ROM drive. (This step is crucial for the CD Audio driver to install properly.) Double-click on the Control Panel's Drivers icon, click on the Add button, and select CD Audio. Windows will prompt you for the original installation disk that contains MCICDA.DRV. After this driver installs properly, start Media Player (you'll find it in the Accessories group) and select Device. CD Audio should be one of your choices.

If it's not, use Notepad to check the CDAUDIO line in MPLAYER.INI. The line should read something like CDAUDIO=17, CDAUDIO. If this value is set to 0, it means Media Player couldn't recognize the CD Audio device, and it's time for some troubleshooting:

- Can you read a non-audio CD-ROM? If not, check the connections to the drive.
- Is your CD-ROM drive connected to the sound card? You may need to run a stereo headphone extension cable between the CD-ROM drive's output and your sound card's stereo line-in jack.

- If you receive an error message that says, "There is an undetectable problem loading the specified device driver," that's probably a sign that you need to update the MS-DOS CD-ROM Extensions (MSCDEX.EXE).



Music too loud? Too soft? Stop playing with the volume knobs on your speakers and start playing with your sound card's Mixer utility.





## The success of AutoCAD has inspired dozens of cheap imitations.

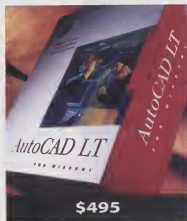
If you need a CAD package but don't need all the sophistication of AutoCAD\* software, don't settle for a cheap imitation. Get new AutoCAD\* LT for Windows.\* Unlike those "bargain" packages, it's based on the world standard—AutoCAD—and gives you features the others can't duplicate. Like more accurate 2D drawing tools for designing

yourself with a question, you'll have access to on-line help as well as free 90-day product support. And since AutoCAD LT reads and writes data just like AutoCAD software, your work will be compatible with over a million AutoCAD users worldwide. Chances are your clients and colleagues are among them. So beware of cheap imitations. Visit your

## And one inexpensive one.

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discrete parts. 3D design and layout tools and full support for layers and blocks. And drawings you can link, so changes on the master are automatically reflected in other drawings. What's more, making these drawings is as easy as using a few simple icons and tools. But if you do find



AutoCAD Dealer or leading retail software store. Or, for a free demo disk, call 1-800-228-3601 and ask us for Demopack A217. Outside the U.S. and Canada, fax 415-491-8311.

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DISPLAY PRODUCTS

Circle 120 on reader service card.

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• Can you play a WAV file using Media Player? If not, the problem is with the sound subsystem, not the CD-ROM.

## The PC Speaker Speaks

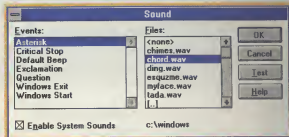
It really does, although the results vary from surprisingly good to fingernails-on-chalkboard screechy, depending on your system. Microsoft makes a generic sound driver that works with a PC's internal speaker, but they haven't shouted that fact from the rooftops. The PC Speaker files aren't on your original Windows disks, so you must download them from the Microsoft Driver Library (CompuServe: GO CIS:MSL). You'll get enough waivers and disclaimers to bring tears to an attorney's eyes. Ignore them—you can't harm your PC with this add-in.

To install the driver, double-click on the Control Panel's Drivers icon and press the Add button. Choose Unlisted or Updated Driver, and specify the disk or directory where the PC Speaker files

are located. By default, the PC Speaker driver disables all interrupts while playing sounds. That makes for better sound quality, but it also freezes the mouse, keyboard, serial ports, and other interrupt-driven processes while the PC speaker is playing a sound. To enable interrupts for serial port activity and mouse movements, select the checkbox in the PC Speaker setup dialog box.

Also note that the Windows 3.1 Media Player doesn't play WAV files when the PC Speaker driver is installed. (Instead, you'll need to use Sound Recorder, found in the Accessories group.) And when the PC Speaker driver is installed, you can't play MIDI files at all.

Here's another problem: If your sound card gets stuck playing one syllable,



Attaching sounds to system events is as easy as matching events from column A with WAV files from column B. And if you don't like the WAV files you have, you can download others from any BBS.

you haven't slipped into the Minimalist Composer Zone, you probably just have an IRQ conflict. When the sound card's interrupt is set incorrectly, the sound driver plays only the first 2K of data in the sound file, over and over again. In some instances, your system can lock up. Here's what to look for to prevent that from happening:

- Make sure the sound card's interrupt is correctly specified in the Control Panel's Drivers dialog box. (Highlight

## PCContact

### This Month's Free Software and Shareware

All the public-domain and shareware programs and utilities featured in *PC/Computing* each month are available on our online service, PC/Contact, or on disk from Public Brand Software for a fee. Shareware requires additional payment to authors for continued use. For information on how to download files from PC/Contact, or how to order files on disk from Public Brand Software, see page 185. All files are in PC/Contact's data library 3 (Utilities/Misc.).

### HyperCD.....Windows, page 180

The Ramones or Rachmaninoff, Bach or the Beatles—HyperCD plays them all. Plus, this free CD player applet uses fewer resources than the Windows 3.1 Media Player. Download HYPERCD.ZIP.

### SafeDisk.....DOS, page 192

Need to encrypt an entire disk? SAFEDISK.COM is a quick way to do it. If you don't want to type in the "Disk Encryption" script on page 192, we've included the original script and the final COM program online. Download SFEDISK.ZIP.

### Speed.....Q&A, page 217

An oldie but goodie: We first covered SPEED.COM in our January 1991 issue. Speed toggles your computer's turbo mode on and off. It's especially useful for those old PC games that played fine on your 286 but run at warp speed on your 486. We've included the SPEED.SCR script along with the actual COM file. Download SPEED.ZIP.



Want to join PC/Contact? See page 185 for instructions.

Circle 222 on reader service card.



**Flexibility** (ˌflek-sə-ˈbil-ə-t-ē) *n.* 1. A feature previously not found in this category. *example:* For under \$800, **TI microWriter™** printers give you the *flexibility* to start with **Adobe® PostScript®** or add it later; the comparable HP 4L does not.



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PostScript	Upgradeable	No	Standard	Standard
Paper Trays	(std.) 250 sheet (opt.) 250 sheet	100 sheet Not Avail.	250 sheet 250 sheet	100 sheet Not Avail.
List Price	\$599	\$849	\$799	\$1279

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Circle 117 on reader service card.



the sound card's driver and click the Setup button to get there.) Look for IRQ conflicts. Creative Labs' Sound Blaster Pro cards, for example, typically default to IRQ 5, while Media Vision Pro Audio Spectrum cards use IRQ 7. You could run into a conflict with the IRQ being used by a parallel port or a network card.

- The repeating sound problem may also occur when the jumper setting on the sound card and the interrupt specified in the driver are not the same.

- If you're certain the driver settings for the sound card are correct but WAV sounds still repeat, the problem may be caused by a defective parallel port card. One of these can lock the interrupt lines so that the controller cannot receive interrupt signals from the sound card.

## Sounds of Silence

If you don't hear sounds from Windows, there are at least four things to check:

- First, make sure the sound card

works in DOS. If it doesn't, the problem is probably physical. Check that the card is seated properly, that the volume control (if any) is turned up, and that the connections to external speakers are firm.

- Check the Control Panel to see whether system sounds are available. If you double-click on the Sounds icon and all your choices are grayed out, reinstall the Windows sound driver. While you're there, make sure the necessary WAV files are in your Windows directory.

- Did your sound card come with a mixer? Even if it has a volume control knob, there may be a software utility that lets you adjust volume, bass, treble, and other output settings. (Sound Blaster owners use SBMIXER.EXE; for the Pro Audio Spectrum, look for PMIX.EXE.) If the volume is set too low here, that explains the silence.

- Finally, a direct memory access (DMA) conflict can cause digital audio

to be distorted or not to play at all. It can also cause your system to lock up, spontaneously reboot, or generate parity errors. To change the DMA setting, use the Setup dialog of the Control Panel's Drivers utility.

## The Final Word

Want to know more about sound? Or about Windows in general? Then pick up a copy of *CD-MOM: The Mother of All Windows Books* (Addison-Wesley). Co-authored by *PC/Computing* Contributing Editor Woody Leonhard and Barry Simon, it's an amazingly complete (and completely irreverent) look at everything involved with Windows. Until next month [cue Warner Bros. *theme music*], Th-th-th-that's all, folks!

Got a tip, trick, or hint? Send it to Windows Help, *PC/Computing*, 950 Tower Lane, 19th Floor, Foster City, CA 94404. We'll send you \$50 if we publish it.

## PCContact

### HOW TO JOIN PC/CONTACT

Current CompuServe or ZiffNet members type GO ZNET.PCCONTACT at any OS 1 prompt. Cost is based on OS's fee of \$12.80 per hour for 1,200 and 2,400-bits per second and \$22.80 per hour for 9,600 and 14,400-bps (rates are lower if you're a OS standard-plan subscriber).

ZiffNet users pay a monthly membership fee of \$2.50. This support fee provides a variety of free and chargeable services. For information about these services, type GO ZNET.ZIFFHELP and download the files GOWORD.TXT and FREE.TXT from library 1 (General Information). For complete hourly rate information, type GO RATES while online.

Follow these steps to join ZiffNet and participate in the PC/Contact forum:

1. Set these modem and software parameters: 7 data bits, even parity, 1 stop bit, full duplex.
2. Call CompuServe's customer assistance line at (800) 848-8990 (United States) or (800) 635-6225 (Canada). From other countries, dial CompuServe direct at (614) 457-8650. You can also call CompuServe with your modem. Set it as instructed above and dial (800) 346-3247. Press Enter when your modem connects. Type PHONES at the HOST NAME prompt, press Enter, and follow the onscreen prompts to find a local access number.
3. Dial the access number with a modem. When your modem connects to the network, press Ctrl-C to get the system's attention.
4. At the HOST NAME prompt, type OS and press Enter.
5. At the USER ID prompt, type 177000.S300 and press Enter.
6. At the PASSWORD prompt, type PC/CONTACT and press Enter.
7. At the ENTER AGREEMENT NUMBER prompt, type PCC94 and press Enter.

### TOP PICKS ON DISK

You can easily get all the public-domain utilities or shareware covered in this month's issue by calling the disk vendor Public Brand Software at (800) 426-3475 or (317) 856-7571. Ask for this month's Editors' Picks from *PC/Computing*. They're available for \$5 or less per disk (most disks have several utilities and programs on them), plus \$5 for shipping and handling.



Circle 223 on reader service card.



# Windows Hot Tips

## INSIDE THIS MONTH

**Make Notepad display all files • Set up Windows for lefties •  
Type foreign characters • Get the mouse in DOS windows**

**PROBLEM:** You want Notepad to display all available files—not just \*.TXT files—in the File Open option.

**SOLUTION:** In File Manager, copy NOTEPAD.EXE to NOTEPAD.BAK. Launch Write, open NOTEPAD.EXE, and click on No Conversion. Select Find, Find, type TXT and press Enter. Notepad highlights the first occurrence of TXT. Click twice on Find Next to skip to the third occurrence, and then click on Cancel to stop the search. TXT should be highlighted. Type “\*” —that’s an asterisk followed by two spaces. (You need to match the length of the replaced and new strings.) Save and exit. Next time you launch Notepad, it will display all of the files in a directory when you select File, Open. If the operation isn’t successful, delete NOTEPAD.EXE and then rename NOTEPAD.BAK to NOTEPAD.EXE.

LENNY BAILES  
SAN FRANCISCO, CALIFORNIA

**PROBLEM:** Some left-handed users find the Windows pull-down menus awkward to use because they drop to the right.

**SOLUTION:** From Program Manager, select File, Run, Notepad. In Notepad, select File, Open, WIN.INI. Locate the [Windows] section of WIN.INI and type the following line under it:

```
MenuDropAlignment=1
```

Save your changes and exit Windows. When you restart Windows, the pull-down menus will drop to the left.

LENNY BAILES  
SAN FRANCISCO, CALIFORNIA

**PROBLEM:** You frequently type foreign words such as *résumé* or *piñata*, and using Character Map to insert special characters is too cumbersome.

**SOLUTION:** Tell Windows that you’re writing in a foreign language. Double-click on the International icon in the Control Panel. In the Language

box, select English (International), and for Keyboard Layout choose US-International. When you click on OK, Windows prompts you to insert one of the original installation disks. After you do that the switch is complete. To type accented characters, type the accent mark followed by the character. For example, to get *é*, type an apostrophe followed by e. If you need to type *Señor*, type *Se-nor*, and the two characters will automatically merge. Umlaut vowels (*ü*, *ä*, and *ö*) are combined with quotation marks. When you want a standard quotation mark to be displayed, type a space after it—for example, to type “Hello” you must follow each quotation mark with a space. *Ma’am* is achieved by typing a space after the apostrophe. Even a word such as *garçon* is a snap (*gar’con*).

SUSAN VOIGHT  
LONDON, CANADA

**PROBLEM:** Other than for performing title bar operations, the mouse ceases

to work when you’re running a DOS application in a window.

**SOLUTION:** This is a really simple adjustment. Load Notepad and open the SYSTEM.INI file. Locate the [NonWindowsApp] section and add the line *MouseInDOSBox=1*. Save the file and then exit Windows. When you restart Windows, the mouse will work for DOS apps—even when the application isn’t running in full-screen mode.

MATTHEW LAKE  
ASSOCIATE EDITOR

**PROBLEM:** Your embedded AVI files in a cordfile don’t play back—you can see the first frame of the movie on a card, but double-clicking on the bitmap doesn’t play it.

**SOLUTION:** The solution’s shorter than the problem! Run the movie by selecting Edit, Picture and double-clicking.

REBECCA ROHAN  
SEATTLE, WASHINGTON

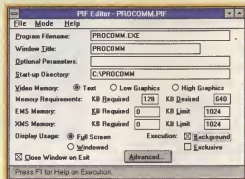
## KILLER TIP: COMMUNICATIONS

**PROBLEM:** You love your DOS communications program but it runs slowly (or worse, not at all) when you run it from Windows.

**SOLUTION:** Some DOS applications (particularly communications programs) don’t take very good advantage of Windows’ multitasking. To overcome this, edit the communications program’s Program Information File (PIF) as follows: In the Main group, Double-click on the PIF Editor, select File, Open, and double-click on the appropriate PIF (for example, PROCOMM.PIF). Check the Full Screen and Background

Execution options, click on the Advanced button, and check the Lock Memory box, which disables application memory swapping. Save and exit. Windows must be in 386 Enhanced mode, and you must have a permanent swap file and enable 32-bit disk access for this tip to work.

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# Thwarting Potential Snoops: The Ultimate DOS Security Guide

Your PC is hardly airtight, so here are some steps to protect yourself.

There was a time when you could store all of your data on a few floppy disks. Lock the floppies in a drawer and you'd call that security. Isn't nostalgia wonderful? Today, your information lives on hard drives and networks, and anyone with an ounce of computer savvy can boot up a PC and rummage through your files.

DOS doesn't help—it's not what you'd call a secure operating system. Don't fret, though: Using some simple DOS commands and a few DEBUG scripts, you can protect the information on your PC from all but the most sophisticated intruders. You can even secure floppy disks before mailing them so that only the intended recipient can read them.

## Safeguarding Files

One of the simplest (and least secure) ways to protect sensitive files on your hard drive is to hide them. In DOS 5 and later versions, the ATTRIB command accepts +H and -H switches, which toggle the hidden attribute bit in a file's directory entry (the 32-byte information packet on disk that stores a file's name, date, and time). When you mark a file with a hidden attribute, it doesn't show up in normal directory listings.

To illustrate, try this simple experiment: First find a file on your hard

drive. We'll assume the file's name is PAYROLL.XLS. Go to the directory where PAYROLL.XLS resides and, at the DOS prompt, type:

```
ATTRIB +H PAYROLL.XLS
```

Now type DIR. The file will no longer appear in the directory listing. To restore the file to its normal state, run ATTRIB again with a -H switch.

The ATTRIB command also works with subdirectory names. Suppose you store files in a subdirectory named \PERSONAL. Rather than hide each file individually, type:

```
ATTRIB +H \PERSONAL
```

The \PERSONAL directory will no longer show up when you type DIR \ or even TREE. Any subdirectories that stem from \PERSONAL are also hidden. To unhide the subdirectory, just run ATTRIB again with a -H switch. The beauty of this technique is that the files in the subdirectory are still perfectly accessible, provided you know the subdirectory is there. The biggest drawback to relying on file attributes to hide your data is that someone can type DIR /AH and see anything you've hidden.

Attribute hiding keeps out the casual browsers, but it's no challenge for the more sophisticated snoops. There's a more effective method you can use to protect individual files from unauthorized access: password-encryption. Various

## DOS APP OF THE MONTH

### Delete by Date

Ever wished you could delete files created on or before a specific date? The vanilla DEL command can't. Delete by Date is a shareware utility that takes over where DOS has left off. Specify a date or range of dates, and Delete by Date prompts you to confirm the deletion. You can download DBD.ZIP from data library 3 (Utilities/Misc.) in PC/Contact. Or you can contact the author, Arthur McKendry, at 3135 Oakwood Drive, Racine, WI 53406, or on CompuServe (75020,1301). See page 185 for information on ordering the disk from Public Brand Software.

PCContact

encryption algorithms are found in the world of computer science, and they range in complexity from patently simple to absurdly complex.

## Encrypting Sensitive Data

In general, the more complex algorithms—such as Data Encryption Standard (DES) and Rivest-Shamir-Adleman (RSA), arguably the most secure encryption schemes in the world—provide higher levels of security. If you don't need a particularly high level of protection, PE.COM may be just what you need. In a text editor such as EDIT in DOS 5.x or 6.x, type the following lines and save the file as PE.SCR:

```
N PE.COM
E 0100 EB 10 00 00 00 00 00 00
E 0108 B8 07 0E CD 10 B8 01 4C
E 0110 CD 21 FC BE 81 00 AC 3C
E 0118 20 74 FB 3C 00 74 E9 3C
E 0120 22 75 E5 88 EE 33 C9 AC
E 0128 3C 22 74 07 3C 00 74 D8
E 0130 41 EB F4 08 C9 74 01 B9
E 0138 0E 06 01 8F DF BE 00 01
E 0140 88 0E 06 01 AC 30 05 47
E 0148 E2 FA B8 00 80 33 D2 F7
E 0150 36 06 01 F7 26 06 01 43
E 0158 02 01 B4 3F B8 00 00 88
```

```
C:\>type try
This file should be encrypted.
C:\>DIR /A encrypt "dragon" try
C:\>type try
lok3"B!W6*4
C:\>DIR /A encrypt "dragon" try
C:\>type try
This file should be encrypted.
```

If you think PE's syntax is awkward, use ENCRYPT.BAT, instead—it's a bit easier. Here we're encrypting and decrypting TRY, a two-line text file.



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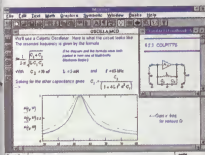
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```
E 0160 0E 02 01 BA A6 01 CD 21
E 0168 72 20 0B C0 74 1C A3 04
E 0170 01 EB 18 00 B4 40 BB 01
E 0178 00 8B 0E 04 01 BA A6 01
E 0180 CD 21 72 06 3B 06 02 01
E 0188 73 D0 B8 00 4C C0 21 8B
E 0190 F5 BF A6 01 8B 0E 04 01
E 0198 AC 3C 22 75 03 8B F5 AC
E 01A0 30 05 47 E2 F3 C3
```

RX  
A6  
W  
Q

To create PE.COM from this script, type DEBUG-PE.SCR. Because PE is a DOS filter program, it has no built-in capabilities to read or write files on its own. You must supply input to the program using DOS's input redirection operator (<), and specify the output destination using an output redirection operator (>). The command

```
PE "nEwYorKcItY" <PAYROLL.XLS >
PAYROLL.ENC
```

reads the file PAYROLL.XLS, encrypts it (in this case, using the *case-sensitive* password "nEwYorKcItY"), and writes an encrypted version of it to the file named PAYROLL.ENC. The encrypted file is the same length as the original, but its contents are a meaningless jumble. It's important to specify different file names for input and output; otherwise, PE could permanently corrupt the file and cause a "Sector not found" message from DOS. For simplicity's sake, create the following batch file and name it ENCRYPT.BAT:

```
@ECHO OFF
IF "%2"==" " GOTO ERROR
PE %1 <%2 >$TMP!!1.929
IF ERRORLEVEL 1 GOTO ERROR
COPY $TMP!!1.929 %2 >NUL
DEL $TMP!!1.929
GOTO END
:ERROR
ECHO Syntax: %0 "password" filename
:END
```

To use ENCRYPT.BAT, type:

```
ENCRYPT "nEwYorKcItY" PAYROLL.XLS
```

This will encrypt PAYROLL.XLS. The longer the password, the more secure the encrypted file. Don't use spaces or other DOS delimiter characters such as commas in the password—these will

cause the batch file to generate a "Syntax error" message. To decrypt the file, repeat the previous command.

There's no way to decrypt a file if you forget the password (unless you're the NSA). So be sure to remember the password, and if a file is ultra-important, consider keeping a decrypted backup copy tucked away in a secure place.

## Password-Locking Disks

PE is great for encrypting individual files, but what if you want to encrypt an entire disk? The script in "Disk Encryption," below, creates SAFEDISK.COM, which quickly and efficiently password-encrypts an entire disk by encoding the disk's file allocation table (FAT) and root directory.

To password-protect the disk in drive A:, type:

```
SAFEDISK "nEwYorKcItY" A:
```

Type DIR on an encrypted disk and

you'll receive a "File not found" message or a random profusion of ASCII characters. Type CHKDSK and DOS will display a long list of errors. To restore the disk, simply run it through SafeDisk again with the same password.

Use SafeDisk to encrypt floppy disks only. There's no reason it couldn't work on a hard drive, but if you make an error entering the DEBUG script, the resulting program could conceivably wipe out the drive. Type the script very carefully—or better yet, download SFEDSK.ZIP from data library 3 (Utilities/Misc.) in PC/Contact. (See page 185 for instructions.) Be sure to test SafeDisk on a few old floppies before you use it on disks containing important files.

Jeff Prossie is not only your DOS guru, he's the author of *Windows Desktop Utilities* (ZD Press, 1994), the book that shows you how to utility-ize DOS.

## DISK ENCRYPTION

**PC/Contact**

For disk encryption that will ward off most prying eyes, you can't beat SafeDisk's price (it's free) or its availability (just type it in). In a text editor such as EDIT in MS-DOS 5 or 6.x, type the following lines and save the file as SAFEDISK.SCR:

```
N SAFEDISK.COM
```

```
E 0100 EB 5E 00 00 00 00 00 00
E 0108 00 00 00 53 79 6E 74 61
E 0110 78 3A 20 53 41 46 45 44
E 0118 49 53 48 20 22 70 61 73
E 0120 73 77 6F 72 64 22 20 41
E 0128 3A 7C 42 3A 0D 0A 24 45
E 0130 72 72 6F 72 20 72 65 61
E 0138 64 69 6E 67 20 6F 72 20
E 0140 77 72 69 74 69 6E 67 20
E 0148 64 69 73 68 0D 0A 24 57
E 0150 6F 72 68 69 6E 67 24 B4
E 0158 09 C0 21 B8 01 4C C0 21
E 0160 FC BE 81 00 BA 0B 01 AC
E 0168 3C 20 74 FB 3C 20 74 E7
E 0170 3C 22 75 E3 8B EE 33 C9
E 0178 AC 3C 22 74 07 3C 0D 74
E 0180 D6 41 EB F4 0B C9 74 CF
E 0188 89 0E 02 01 56 8B FD BE
E 0190 60 01 8B 0E 02 01 AC 30
E 0198 05 47 E2 F4 5E AC 3C 20
E 01A0 74 FB 3C 0D 74 B1 24 DF
E 01A8 3C 41 74 04 3C 42 75 A7
E 01B0 2C 41 A2 0A 01 0A 0A 01
```

```
E 01B8 B9 01 00 BA 00 00 8B 56
E 01C0 C2 CD 25 72 73 9D A1 61
E 01C8 02 A3 04 01 A1 64 02 A3
E 01D0 06 01 A1 6C 02 8A 1E 66
E 01D8 02 32 FF F7 E3 A3 08 01
E 01E0 08 02 74 06 C7 06 08 01
E 01E8 00 80 A1 67 02 B1 04 03
E 01F0 E8 01 06 08 01 B4 09 BA
E 01F8 4F 01 C0 21 A0 0A 01 B9
E 0200 01 00 88 16 06 01 8B 56
E 0208 02 CD 25 72 2B 9D E8 2E
E 0210 00 A0 0A 01 B9 01 00 8B
E 0218 16 06 01 8B 56 02 C0 26
E 0220 72 16 90 84 02 B2 2E C0
E 0228 21 FF 06 06 01 FF 0E 08
E 0230 01 75 C9 88 00 4C C0 21
E 0238 90 BA 2F 01 E9 18 FF 8B
E 0240 F5 BF 56 02 8B 0E 04 01
E 0248 AC 3C 22 75 03 8B F5 AC
E 0250 30 05 47 E2 F3 C3
RX
156
W
Q
```

To create SAFEDISK.COM from this script, type DEBUG-*SAFEDISK.SCR*. See "Password-Locking Disks," above, for how to use it. If your fingers get numb from all that typing, download SFEDSK.ZIP from data library 3 (Utilities/Misc.) in PC/Contact.



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# DOS Hot Tips

## INSIDE THIS MONTH

Program your function keys • Create a better MOVE command • Safe-delete files • Bypass the Yes or No prompt

**PROBLEM:** Your keyboard has ten function keys, but DOS doesn't use them.

**SOLUTION:** Program them. By including escape codes in the PROMPT statement of AUTOEXEC.BAT, you can assign keystrokes to the function keys. The escape codes for F1 through F10 are 59 through 68 (F1=59, F2=60, and so on). In a text editor such as EDIT in MS-DOS 6.x, edit your AUTOEXEC.BAT file, and modify your PROMPT statement as follows:

```
PROMPT
$e[0;59;"DIR/O/P";13p$e[0;60;
"WIN";13p$Pg
```

This prompt assigns the commands DIR/O/P to F1 and WIN to F2. Each key assignment starts with the escape code \$e[ and ends with the carriage return code \$P.

There are some caveats, however. First, DOSKEY uses F7, F8, and F9, so don't program them if you use DOSKEY. Second, you must load the ANSYSYS driver in your CONFIG.SYS file. Finally, if you receive an "Out of environment space" error, increase the allocated environment space by modifying the SHELL statement in CONFIG.SYS as follows:

```
SHELL=C:\DOS\COMMAND.COM C:\DOS
/E:1024 /P.
```

To find out more about escape codes, go to the DOS directory and type HELP. Locate the ANSYSYS line to view the escape codes for Shift, Ctrl, and Alt key combinations.

PATRICK KALISCHKO  
VICTORIA, TEXAS

**PROBLEM:** MS-DOS 6's MOVE command requires a destination directory, even if you're moving files to the current directory.

**SOLUTION:** Create a batch file to overcome this limitation. In your DOS directory, type EDIT MV.BAT and enter the following lines:

```
@ECHO OFF
```

```
SET FROM=%1
SET TO=%2
IF "%TO%"==" " SET TO=.
MOVE %FROM% %TO%
```

Save the file. Use MV instead of MOVE, and you won't need to specify the destination.

KEVIN BACHUS  
FOSTER CITY, CALIFORNIA

**PROBLEM:** You can't undelete deleted files after you have saved new files.

**SOLUTION:** Whenever you delete a file you should automatically move it to a temporary directory until you decide whether you need to undelete it or not. To create that directory, type MD\TEMPDELS. Next, open AUTOEXEC.BAT in a text editor such as EDIT in MS-DOS 5 or 6.x and add the following line below the PATH line:

```
LH DOSKEY DEL=copy $1 C:\TEMP-
DELS$TDEL $1
```

If your system is a 286 or earlier, omit the LH. Because DOSKEY macros precede all same-name commands (including internal ones), when you type DEL filename, first the file

will be copied to the CATEMPDELS directory, then it will be deleted from its original location. When you're sure you want the files deleted and you try to remove them from the TEMPDELS directory, DOS will display an error message: "File cannot be copied onto itself." But the command will work.

S. G. HUBERT  
LAHAINA, HAWAII

**PROBLEM:** Under MS-DOS 6.2, CHKDSK requires a Yes or No response, but you want to save yourself that one keystroke.

**SOLUTION:** Although ScanDisk provides more thorough testing than CHKDSK does, you sometimes need to perform a quick-and-dirty disk check. In a text editor such as EDIT, create the file CHECK.BAT, as follows:

```
@ECHO OFF
ECHO Y|CHKDSK/F
```

Save CHECK.BAT in a directory in your PATH. If you run CHECK instead of CHKDSK/F, you won't be prompted for a Yes or No response.

S. G. HUBERT  
LAHAINA, HAWAII

## KILLER TIP: FINDING FILES

**PROBLEM:** You're looking for a specific file or files with a particular extension, but you don't know which drive and directory to search.

**SOLUTION:** In a text editor such as EDIT in DOS 5 or later, create WHEREAS.BAT and save it to a directory listed in your PATH statement (for example, C:\DOS). Here's the code for WHEREAS.BAT:

```
@ECHO OFF
CLS
ECHO LOOKING FOR %1...
FOR %d IN (C D E F G) DO DIR %d:\%1 /S /P
```

Replace the drive letters in the parentheses with your partition and drive letters. To use this batch file, type WHEREAS filename. For example:

```
WHEREAS MYFILE.DOC or WHEREAS *.ZIP.
```

ROGER W. SAUER  
FAIRFIELD, CALIFORNIA





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# App Tips: Word Processors

## INSIDE THIS MONTH

Create checklists in Word • Trace Excel's worksheet formulas •  
Convert birth dates to ages in FoxPro



### Microsoft Word 6.0

**PROBLEM:** You need to circulate two versions of the same memo, one for general distribution and one with sensitive information for VIPs only.

**SOLUTION:** One way would be to create and save two separate files, but here's a better solution: Create a new style to hide the sensitive text. Select Format, Style, New, and type Confidential into the Name box. Press the Format button, select Font, Hidden, OK. Type the memo, print out the full version, and then select the sensitive text and apply the Confidential style from the Style box on your toolbar. Print the modified version. When you finish printing, click on the Undo button to remove the Hidden format. Teachers, human resource specialists, and others can apply this method to create tests and answer keys.

RONNY RICHARDSON  
CHAMBLEE, GEORGIA



### WordPerfect 6.0

**PROBLEM:** Formulas in tables display zeros when the cells they refer to are empty.

**SOLUTION:** If you create invoices, for example, the hard copy may include zeros in cells containing formulas, which will look weird. To fix the problem, instead of the regular SUM function, type the following formula:

```
IF(ISVALUE(B1:B10),SUM(B1:B10),"")
```

This conditional formula sums the specified range only if there are values in the cells, otherwise leaving the cell blank.

GORDON MCCOMB  
OCEANSIDE, CALIFORNIA

**PROBLEM:** When you open a file in WordPerfect, it doesn't automatically take you to the last place you were working.

**SOLUTION:** First define a bookmark: Place your cursor at the desired location and select Insert, Bookmark, Create. Type a name (any name) for the bookmark and press Enter.

Now create a macro to go to the bookmark: Select Tools, Macros, Record, type a name for the macro (GOTOMARK, for example), and click on the Record button. Now press Ctrl-G for Go To, select Bookmark, and if you have more than one, scroll down the list until you find the one you need. Click on OK, select Tools, Macros, and deselect the Record line. Save the document and exit WordPerfect.

In a Windows Program Manager group, create a new icon. Select File, New, Program Item. For the description, type WordPerfect Bookmark Test. In the Command Line box, type:

```
C:\WPWIN60\WPWIN.EXE filename  
/M=GOTOMARK
```

(Replace *filename* with the name of the file into which you just inserted the bookmark. We'll use MYNOVEL in this example.) Type C:\WPWIN60 for Working Directory and select an icon. When you double-click on that icon, WordPerfect opens the file MYNOVEL and executes the GOTOMARK macro. Since you'll want the bookmark to

move when you make progress, you'll need to select Insert, Bookmark, Move while your cursor is at the new location.

S. G. HUBERT  
LAHAINA, HAWAII



### Ami Pro 3.0

**PROBLEM:** A cell containing a formula displays REF instead of a value.

**SOLUTION:** REF is an indication that a formula refers to a cell or cells that contain text rather than a value. If you type a space before a number, that entry is not a value, even though it appears as a number on the screen. To identify this situation, select Style, Modify Style, Table Format. Change the format for the entire table (for example, select five decimals), and click on OK. Look at your table: Any number that doesn't include five decimals is not a value. Retype the values in each of these cells, and the REF will disappear. Reset the entire table to the original format.

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## KILLER TIP: MICROSOFT WORD 6.0

**PROBLEM:** You need to create a checklist with check boxes at the beginning of each paragraph—on a survey you're sending out, for example.

**SOLUTION:** Here's a macro to place a check box before each paragraph. The check box is a WingDings character, so make sure the WingDings font set is available. To create the check box, select Tools, Macros, type CheckBox for the name, and click on the Create button. Type the following text between Sub MAIN and End Sub:

```
FormatBullet .Points = "Auto", .Color = 0,  
.Alignment = 0, .Indent = "0.25" + Chr$(34),  
.Space = "0" + Chr$(34), .Hang = 1, .CharNum  
= "114", .Font = "Wingdings"  
CharRight 2  
LineDown 1  
FormatBullet .Points = "Auto", .Color = 0,  
.Alignment = 0, .Indent = "0.25" + Chr$(34), .Space = "0" +  
Chr$(34), .Hang = 1, .CharNum = "183", .Font = "Symbol"  
FormatBulletDefault
```

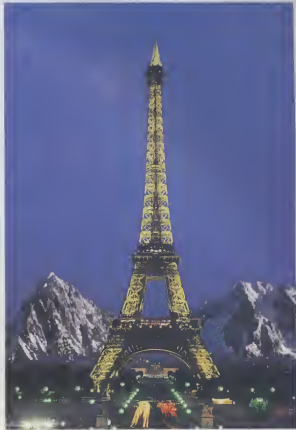
Type Ctrl-W, and answer Yes to save and exit. To apply check boxes to a list, first select the text and then run the macro.

S. G. HUBERT  
LAHAINA, HAWAII





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# App Tips: Spreadsheets



## Microsoft Excel 5.0

**PROBLEM:** Your worksheet formulas reference many cells and blocks, making it difficult to follow the chain of events.

**SOLUTION:** Go to the cell containing the formula you want to track, and press Ctrl-Shift-[ (left bracket). You'll highlight all the cells this formula references. Use the scroll bars to view them. Don't use the arrow keys, though—they'll turn off the highlighting, leaving you where you started.

BURT WALDEN  
SAN FRANCISCO, CALIFORNIA



## Lotus 1-2-3 Release 4

**PROBLEM:** You want to fill cells with your own series and sequences automatically.

**SOLUTION:** Create a custom AutoFill. Here's an example: Let's say your company has many divisions and you always have to reenter their names into a worksheet. Double-click on the Notepad icon in the Accessories group, and open FILLS.INI (located in the PROGRAMS subdirectory under your Lotus 1-2-3 for Windows directory, normally \123R4W). Create a new AutoFill set by typing (SET n), where n is one number higher than the previous set. Now add your items as in the following example:

```
[SET 4]
ITEM1=Chicago
ITEM2=New York
ITEM3=Los Angeles
ITEM4=Houston
ITEM5=Seattle
```

When you need to enter the division names into your spreadsheet, type "Chicago" in one cell; select the fill range with the mouse; and select Range, Fill by Example. Lotus 1-2-3 will fill in the rest of the cities automatically. The fill range may be arranged vertically or horizontally.

JEFFREY A. ROCK  
WATERTOWN, WASHINGTON

**PROBLEM:** There is no menu option for renaming a worksheet tab.

**SOLUTION:** This tip is great if you ever find yourself working without a mouse. Just write this macro to rename worksheet tabs. The syntax is:

```
{SHEET-NAME "newname", "oldname"}
```

To give the name 1996 to sheet B, enter {SHEET-NAME "1996";"B"} into any cell outside your print range. Use the Range, Name command to give this cell a name, such as "N," and execute it by pressing Ctrl-N. If you omit the old worksheet's name, you'll rename the current sheet tab. The

```
{SHEET-NAME-DELETE [worksheet-  
name]}
```

macro command removes a sheet name and returns it to its original sheet letter.

To make this macro interactive, type the following line:

```
{GETLABEL "Enter name for current  
sheet: ",GETIT}
```

Then use the down-arrow key to move to the cell immediately below that one, and type {SHEET-NAME GETIT}. You need to name one empty cell GETIT, so select Range, Name, type GETIT, and type the designated cell address. Whenever you press Ctrl-N, a dialog box will prompt you to name the current sheet.

ROBIN J. WALDEN  
LA JOLLA, CALIFORNIA



## Lotus 1-2-3 Release 3.4

**PROBLEM:** You often need to stamp the filename, date, and time in the header of an important worksheet.

**SOLUTION:** You can do this by typing

the following formula into one cell outside your print range:

```
+{"=ASC(&CELLPOINTER("filename")&  
"&CHOOSE(@MOD(@NOW,7),"Sat.,  
"Sun.", "Mon.", "Tues.,  
"Wed.", "Thurs.", "Fri.", )  
&CHOOSE(@MOD(@MONTH(@NOW),12),  
"Dec.", "Jan.", "Feb.", "March",  
"April", "May", "June", "July",  
"Aug.", "Sept.", "Oct.", "Nov.",  
")  
&STRING(@DAY(@NOW),0)&  
"&STRING(@YEAR(@NOW)+1900,0)&  
"&IF(@HOUR(@NOW)<13,@STRING(@HOUR  
(@NOW),0),@STRING(@HOUR(@NOW)-  
12,0))&";"  
&IF(@MINUTE(@NOW)<10,"0"  
&STRING(@MINUTE(@NOW),0),@STRIN  
G(@MINUTE(@NOW),0))&IF(@HOUR(@NOW)  
<13," a.m.", " p.m.")
```

Despite the line breaks shown above, this formula is all one line. The ^ A at the beginning means Ctrl-A—an attribute code. Here it's telling Lotus 1-2-3 to display the result of the formula in the fifth default font. You can change that font by substituting the number of any font you want to use. (Try experimenting to see which is which.) To include this formula in a header or footer, type a backslash followed by its cell address (for example, \M36).

BILL EDDINGS  
BIRMINGHAM, ALABAMA

## KILLER TIP: LOTUS 1-2-3 FOR DOS

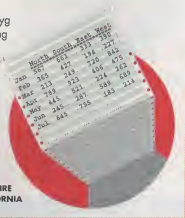
**PROBLEM:** You want to show row numbers and column letters in a draft-mode printout.

**SOLUTION:** You don't want to use the Wysiywg odd-on in Release 2.3 or later because printing with it takes too long. Assuming that your print range starts with column A, type the following formula in any empty cell in that column:

```
@MID(@CELL("Address",A1..A1),1,@FIND  
("$",@CELL("Address",A1..A1),1)-1)
```

Copy this formula into empty cells in every column in your print range, then print the worksheet.

SHANE DEVENSHIRE  
WALNUT CREEK, CALIFORNIA





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Circle 144 on reader service card.



# App Tips: Databases



## Microsoft Access 1.1

**PROBLEM:** You want a report to count how many Yes and No answers there are in a Yes/No field of a table.

**SOLUTION:** This is easiest to show by example. Say that you want to know how many active and inactive customer accounts you have per city. In your database, add a Yes/No field called Active and make sure you have a field called City. Next, create a report using the ReportWizard. Tell it to sort and group the report by City, and insert the following formulas in the report's footer:

```
=SUM(VAl(IIF([Active],1,"")))
=SUM(VAl(IIF([Inactive],1,"")))
```

A Yes/No field assigns 1 to Yes and 0 to No. These formulas simply total all the ones and zeros. The first formula counts the Active accounts, and the second one the Inactives. Place a text box next to each formula, identifying them as "Total Active" and "Total Inactive," respectively.

GWYNNE CORDOVA  
EVANSVILLE, INDIANA



## dBASE IV

**PROBLEM:** Your users don't always enter valid dates into a data entry screen.

**SOLUTION:** Edit the input screen by typing MODIFY COMMAND filename, where filename is the name of your input screen file. If you use a GET command, such as

```
@10,20 GET m_dob PICTURE "@E
99/99/99,"
```

the rest is easy. Create a variable (call it date1), and use the STUFF() function to insert delimiters into the user-entered date. Then convert date1 to a dBASE date and back to a character string, storing the result in date2. Just add the following lines after the @...GET line:

```
date1 = STUFF(STUFF(m_dob,5,0,"/")
,3,0,"/")
date2 = DTOC(CTOD(date1))
```

To compare the two strings, use either IF...ENDIF or IIF, as follows:

```
IIF(date1=date2,"T",chr(7)+"F")
```

If the date entered is not valid, the system will beep.

ROGER SAUER  
FAIRFIELD, CALIFORNIA

**PROBLEM:** You want to use the plus and minus keys on your numeric keypad to increase or decrease dates.

**SOLUTION:** If you have a procedure file, add the following three User Defined Functions (UDFs) to it. To create a new procedure file, type MODIFY COMMAND MYPROC, and type these lines into it:

```
FUNCTION OKL_on
ON KEY LABEL + DO DateMod WITH 1
ON KEY LABEL - DO DateMod WITH -1
RETURN .T.
FUNCTION OKL_off
ON KEY LABEL -
ON KEY LABEL +
RETURN .T.
PROCEDURE DateMod
PARAMETERS mod_val
IF .NOT. emp_date = {}
emp_date = emp_date + mod_val
06,27 SAY emp_date
ENDIF
RETURN
```

To use these UDFs in an input screen procedure, add these lines to your input screen file:

```
emp_date = DATE()
06,15 SAY "Hire date: " GET
```

```
emp_date ;
WHEN OKL_on() VALID REQUIRED
OKL_off()
READ
```

Use the WHEN clause to start trapping the plus and minus keys and the VALID REQUIRED parameter to cancel trapping. You must cancel trapping so that other GETs in the procedure can use the plus and minus keys. This procedure increases or decreases the day, not the month or the year.

ROGER SAUER  
FAIRFIELD, CALIFORNIA



## FoxPro 2.5 for DOS

**PROBLEM:** You want your report to convert birth dates into ages.

**SOLUTION:** Just modify the following example. Assuming you have a database called EMPLOYEE that includes a field called DOB, go into the Report Writer and insert a field by pressing Ctrl-F. In the Expression box, type INT((DATE()-EMPLOYEE.DOB)/365.2425). Set the width to 2 characters and the alignment to Left. When you run the report, it will show actual ages. Because you're displaying an integer value, the age will change only on the employee's birthday (so that one day before their 40th birthday, their age shows up as 39).

MIKE DELANEY  
NEW CASTLE, DELAWARE

## KILLER TIP: dBASE IV

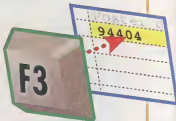
**PROBLEM:** You want a quick way for people entering data to insert often-repeated information. For example, your city, state, and ZIP code should be a one-key default.

**SOLUTION:** First, make sure that you have multiple-choice fields called City, State, and ZIP, and that they are next to each other on your data-entry screen. In addition, they should contain default information reflecting a particular city's information. Next, add the line SET FUNCTION 3 TO ";;" to your data-entry procedure before the SAY and GET statements. Now add a message like this to the GET CITY line:

```
@ 8,37 GET City PICTURE "@M Foster
City,San Francisco,Los Angeles"
MESSAGE "For Foster City address,
press F3 to skip City, State & Zip"
@ 9,26 SAY "STATE"
```

In data-entry mode, pressing F3 on the city field will insert the default value "Foster City, CA 94404."

CAROLYN GORUP  
COLUMBUS, OHIO





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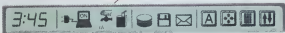


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# Symmetric Multiprocessing

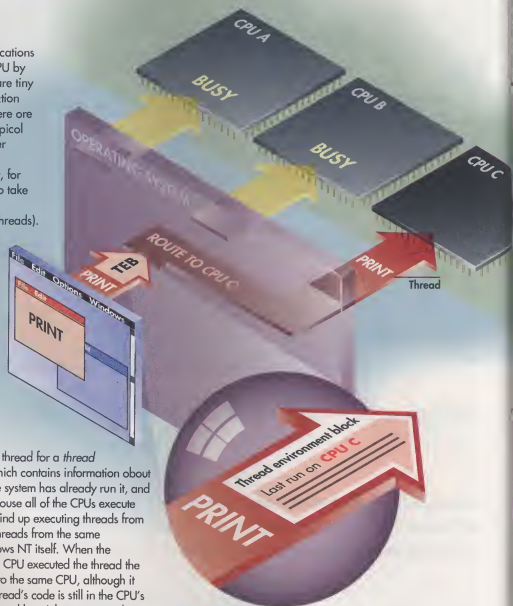
How Windows NT takes advantage of more than one CPU.

By Ron White. Illustrated by Timothy Edward Downs.

Why settle for one Pentium when you can have two? Or eight? Or twenty-four? More is better. That's the philosophy behind symmetric multiprocessing (SMP). By running different applications—or even different

parts of the same application—on different CPUs within the same computer, SMP boosts performance substantially. Here's how Microsoft's Windows NT implements SMP.

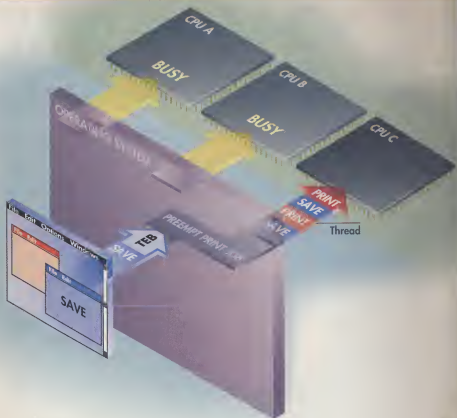
**1** Windows NT enables applications to run on more than one CPU by dealing with *threads*. Threads are tiny chunks of applications that function more or less independently. There are several threads running on a typical system at once—at least one per application. When you tell an application to print a document, for example, it launches a *thread* to take care of the job (assuming the application was written to use threads).



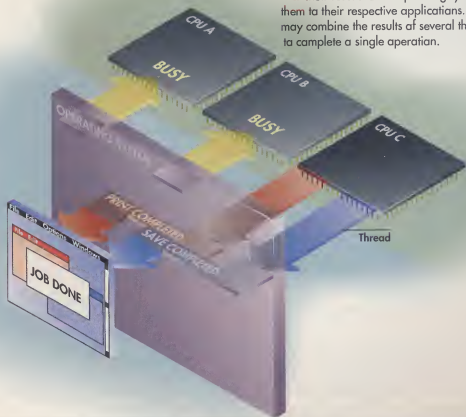
**2** Windows NT inspects each thread for a *thread environment block (TEB)*, which contains information about the thread, including whether the system has already run it, and if so, which CPU executed it. Because all of the CPUs execute code independently, they may wind up executing threads from different applications, different threads from the same application, or threads of Windows NT itself. When the operating system finds out which CPU executed the thread the last time, it can route the thread to the same CPU, although it doesn't have to. If some of the thread's code is still in the CPU's cache, it executes faster. If the thread hasn't been executed previously, Windows NT sends it to the first available CPU.



**3** If all of the CPUs are busy, Windows NT temporarily preempts, or interrupts, the execution of one thread and makes its CPU execute a different one, causing a miniscule delay for the first thread. This gives all applications running under Windows NT equal access to the CPUs. Certain threads, including the system timer, get privileged status and are nearly impossible to preempt.



**4** When threads have been executed, they return their results to the operating system, which routes them to their respective applications. An application may combine the results of several thread executions to complete a single operation.





## VESA Local Bus and PCI Fight For a Seat on Your Next System

Before you choose, make sure you separate the specs from the hype.

A decade ago, the ultimate user interface entailed selecting option 1, 2, or 3 on a monochrome text display—not very demanding. Now user interfaces have windows, icons, toolbars, mice, and generally look like multimedia light and sound shows. They require your system hardware to move more data faster.

The simplest way for a designer to increase the overall performance of a computer system is to speed up its clock. In fact, the design of IBM's early PC-AT systems allowed users to do just that, bumping the speed from 6MHz to 8MHz and higher. But simply increasing clock speed requires a faster version of every component in the system (RAM chips, expansion cards, and so on), raising its

cost and complexity. Newer systems include more sophisticated ways to boost CPU clock speed, such as Intel's OverDrive socket and CPUs on daughter-cards that plug in to special buses.

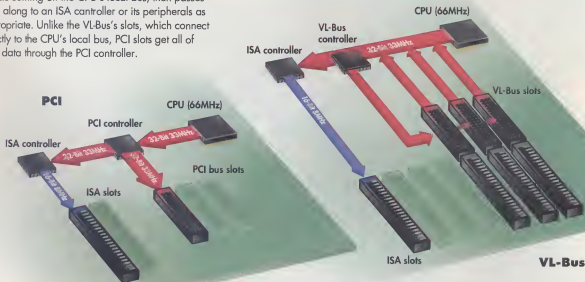
System performance also improves if you offload a portion of the processing burden from the CPU. Floating-point math on an integer processor is slow, for example. Add a math coprocessor

and you'll speed up your system tremendously if what you do is floating-point intensive, like large spreadsheet recalculations. (Intel's 486SX doesn't include a floating-point processor, but the DX has one built in, in case you're interested.) To relieve the CPU of burdens, your PC employs many such specialized coprocessors, including those that handle serial communications, graphics, and external cache control.

No matter how fast your processor and other system components are, data transfers between them must pass over your system's I/O bus. Shackling your 32-bit, 66MHz processor to an 8-bit, 8MHz ISA bus produces a serious bottleneck and degrades the performance

### HOW VESA LOCAL BUS AND PCI WORK

PCI is a mezzanine bus—it sits between the CPU and other buses. The PCI controller examines all signals coming off the CPU's local bus, then passes them along to an ISA controller or its peripherals as appropriate. Unlike the VL-Bus's slots, which connect directly to the CPU's local bus, PCI slots get all of their data through the PCI controller.



The VL-Bus controller decodes the signals from the CPU before they reach the ISA controller, pulling out those destined for peripherals that are in VL-Bus slots. Once the VL-Bus controller tells one of its peripherals to execute signals, that peripheral talks directly to the CPU's local bus.



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## SO SIMILAR, YET . . .

VL-Bus and PCI have some important differences.

	VL-Bus	PCI
Theoretical maximum throughput	132MBps	132MBps
Actual throughput in burst mode (on a 33MHz 486)	107MBps	76MBps
Slots	3 (typical)	3 (typical)
Plug-and-play support	No	Yes
Cost	Inexpensive	Moderate, trailing off over time
Ideal use	Desktop 486s	High-end desktops and servers

of your entire system. Despite some attempts to improve bus performance—including EISA and IBM's Micro Channel architecture—the processing demands of modern software have outstripped the bus's capability to transfer data between the CPU and peripherals. To recover the performance edge, system designers turned to the fastest interface available on the PC: the CPU's local bus. Now two standards are battling for domination of the high-speed bus market: VESA's Local Bus (VL-Bus) and Intel's Peripheral Component Interconnect (PCI) bus. (For information on some of the PCI systems you can buy, see "Pennywise Pentiums," page 104.)

### The CPU Local Bus

The x86 CPU's local bus (not to be confused with the VL-Bus, which we'll get to next) is simply a set of traces on a printed circuit board—a direct extension of the CPU's pins. Operating at high speed, the local bus carries information between the CPU and floating-point coprocessor, main memory, and system controller. All information that passes to or from the CPU goes via the local bus.

The local bus operates at the CPU's external clock speed, transferring data far faster than traditional I/O buses do. And the local bus interface also requires simpler, less expensive circuitry than a full-fledged I/O bus, so it provides increased speed at a lower cost.

devices connected to the local bus. Add too many devices to the local bus and the CPU wilts under the load.

All of these problems and more stem from the fact that the local bus was not designed as a general-purpose system bus. There were no connector standards or interface protocols when it was introduced, for example. Still, because the performance improvements were so great, many manufacturers designed proprietary schemes to connect to the CPU's local bus. Unfortunately they were just that: proprietary.

### VESA and the VL-Bus

High-resolution graphics was one of the first types of application to exceed the capacity of traditional I/O buses. Video hardware manufacturers naturally cast a hungry eye toward the local bus. To address the lack of a standard local-bus interface, a group of manufacturers formed the Video Electronics Standards Association (VESA).

VESA did not design a completely new standard: For the most part, it used the electrical and timing rules of the standard 486 CPU bus. VL-Bus added signal protocol and timing, mechanical layout, and physical characteristics. The VL-Bus, therefore, became an extension of the standard 486 bus.

The same clock that drives the CPU typically drives the VL-Bus, up to a maximum speed of 50MHz. At speeds of 40MHz and slower, the VL-Bus can perform a zero wait-state write and a one

wait-state read—that's *really* fast and very efficient. At faster than 40MHz, both read and write transfers require two wait states each. Using the 486's burst mode, a 33MHz VL-Bus can transfer four 32-bit words in a single burst for a staggering 107MB per second (MBps) throughput.

### Intel's PCI Bus

While the VESA group worked on the VL-Bus, Intel was hard at work on its own high-speed bus standard. Strictly speaking, Intel's PCI standard is not a local bus, but rather a *mezzanine bus*—that means it sits between the CPU's local bus and the system I/O bus.

Unlike the VL-Bus, PCI is not tied to the speed of the CPU. It can operate at speeds as fast as 33MHz, slow down, or even stop (to save power) if there is no activity on the bus. All of this occurs independently of the CPU's operation. When the PCI bus is operating at 33MHz, it also transfers four 32-bit words in a single burst. However, PCI's extra circuitry acts as an overhead that limits typical performance to a 76MBps transfer rate. Very long burst-sequences can approach the theoretical maximum transfer rate of 133 MBps.

The PCI bus architecture makes it an ideal environment for bus-mastering controllers. Because a system's main memory is isolated from PCI, bus-mastering controllers can continue to transfer data to one another while the CPU continues to operate out of main memory. PCI also holds out the promise of self-configuring expansion cards and automatic conflict resolution—in other words, plug and play.

So which do you want? Choosing between PCI and VL-Bus means evaluating your current and future computing needs. Here's a brief review of their characteristics and what they mean to you.

- **Speed.** Both PCI and VL-Bus are about ten times faster than current ISA systems and about three times faster than the fastest EISA or Micro Channel systems. A typical VL-bus-based 486 system will outstrip a similar PCI system when transferring data between main memory and a local bus peripheral.

- **Cost.** The VL-Bus resembles the 486 bus so closely that it's inexpensive for a vendor to add one to a system.



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**F1**

Initial PCI designs will require a new design effort, which will raise design and manufacturing costs.

- **Capacity.** Both buses typically support up to three slots. With each additional bridge circuit, however, vendors gain five more slots.

- **Availability.** VL-Bus peripherals became available in the fall of 1992, so you'll find that other users have already debugged them for you. If you choose PCI, you'll have to wait for peripherals, pay more, and possibly find some bugs yourself.

- **Bridge.** For maximum raw speed between the CPU and a peripheral, a true local bus (non-bridged) outperforms a bus that requires a bridge. For the Pentium and future chips, however, the VL-Bus design will require a bridge, so VL-Bus will lose some of its advantage over PCI. Look for PCI to be designed right into the silicon of future CPUs, eliminating external bridge circuitry and giving PCI the edge.

Both the VL-Bus and the PCI bus offer outstanding performance for demanding applications such as high-resolution video graphics, and neither offers a clear technical advantage over the other. The generalized nature of the PCI bus makes it more attractive to designers of Pentium-based and later systems, where the environment frequently includes multiple processors or processors of different types.

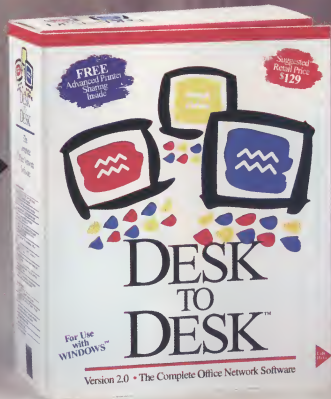
On the other hand, the similarity of the VL-Bus to the 486 CPU bus, and hence its lower cost, makes it a popular design choice for 486 systems. Shipping in great numbers since 1992, the VL-Bus enjoys a large installed base and offers users a wide selection of VL-Bus expansion cards ranging from video cards to disk controllers. The continued strong presence of a myriad of 486 chips, from entry-level to midrange power, ensures that the VL-Bus will be around for a long time. If your plans include a multi-processor Pentium, you may want a PCI-based system. But for most of us, the VL-Bus provides the same high performance at a bargain price. ■

You can reach Robert L. Hummel on CompuServe at 72241,2222 or by writing to him at PC/Computing, 950 Tower Lane, 19th Floor, Foster City, CA 94404.



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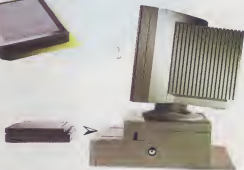
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## INSIDE THIS MONTH

PostScript on LaserJets • 32-bit File Access explained •  
VRAM, DRAM, and SRAM • Keyboard woes solved

## PostScript for My LaserJet IIIP?

I have a Hewlett-Packard LaserJet IIIP that I use in Windows. I noticed that there is a Windows driver for the Hewlett-Packard LaserJet IIIP PostScript printer. If I select this printer driver, will I get PostScript output from my printer?

ROSSELLE HINDS  
TUCUMCARI, NEW MEXICO

The LaserJet IIIP PostScript driver alone won't give you PostScript printing. To use PostScript on a standard IIIP, you need a PostScript cartridge from either Hewlett-Packard or Pacific Data Products. If true PostScript is your goal, get a PostScript cartridge that's right for both your printer and your applications.

You should also try some third-party font products. It's often difficult to distinguish them (with the naked eye) from true PostScript fonts. Products such as Bitstream FaceLift, Adobe Type Manager, Owl Software's PowerPak, LaserTools' PrimeType, Swift's Typecase, and Microsoft TrueType Font Packs all provide scalable fonts. Depending on how much memory your printer has and which applications you're using, you should start with a quality scalable font product such as Adobe Type Manager or Microsoft TrueType Font Packs.

## 32-bit File and Disk Access

Now that I know the term FastDisk represents 32-bit Disk Access, Windows for Workgroups 3.11 yields yet another term: 32-bit File Access. What is 32-bit File Access, and how is it different from 32-bit Disk Access?

TASHA JOHANSEN  
BURGHARD, MICHIGAN

In short, 32-bit File Access is Windows for Workgroups 3.11's protected-mode file cache. If that doesn't mean anything to you, try this explanation: When a computer opens or closes files, runs applications, or sends print requests, it typically uses functions in the PC's ROM BIOS to access

the hard disk. These requests are processed in what is called *real mode*. In real mode, the system can do only one thing at a time, so this process is pretty inefficient.

Windows is a *protected mode* application. That means it provides each application with its own dedicated memory space and control over peripheral devices. In order to process I/O requests, however, Windows must still slip into real mode—and that's a big bottleneck.

The FastDisk disk driver included with Windows 3.1 bypasses the ROM BIOS and processes requests directly. With FastDisk, Windows doesn't have to slip into real mode at all, thereby speeding things up.

Windows for Workgroups' latest release—Version 3.11—includes a new virtual driver called VCACHE to

complement FastDisk. VCACHE provides a 32-bit virtual file cache which, like FastDisk, bypasses the ROM BIOS, reducing the size requirements for SmartDrive's Win-Cache and alleviating the need to switch to real mode.

There is one caveat here, though: According to our technical sources, VCACHE is not compatible with DoubleSpace from any version of MS-DOS prior to 6.2, so you'll need to upgrade to 6.2 before setting up 32-bit File Access on your system.

## RAM Definitions

What is the difference between  
DRAM, VRAM, and SRAM?

SUSAN MCDONNELL  
ALEXANDRIA, VIRGINIA

They're all random access memory (RAM), but each does a different job:

## HELP ABOUT: TOGGLE TURBO MODE

My computer lacks a turbo button. Is there an easy way for me to toggle the turbo mode on my system for some old games?

JAMES HAHN  
MURRAY, KENTUCKY

Here's a favorite solution from the January 1991 issue of *PC/Computing* ("Key to a Faster Beat," page 168)—it's been requested nearly every month since publication. First, enter these lines into a file called SPEED.SCR with an ASCII text editor:

```
N SPEED.COM
E 0100 EB 17 90 4D 75 73 74 20
E 0108 73 70 65 63 69 66 79 20
E 0110 2B 20 6F 72 20 2D 00 0A
E 0118 24 BE 80 00 80 3C 02 73
E 0120 08 B4 09 BA 03 01 CD 21
E 0128 C3 8A 44 02 3C 2B 75 07
E 0130 E4 3D 0C 04 E6 3D C3 3C
E 0140 3D C3
RCX
0042
W
Q
```



To create the program using DOS's DEBUG utility, type DEBUG < SPEED.SCR at the DOS prompt. This will create SPEED.COM in the current directory. To run the program, type SPEED + to speed up, or SPEED - to slow down, the system clock speed on your computer.

Please note that this may not work with some operating systems (such as DOS versions prior to 3.0 or DR DOS 6.0 or earlier). It also may not work with some system BIOSs. Download SPEED.ZIP from PC/Contact's data library 3 (Utilities/Misc.).



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## Q&A

DRAM, *dynamic* random access memory, is *volatile* RAM—when your system stops supplying it with power, it loses its contents. It generally comes in 1MB and 4MB *banks* running at speeds from 100 nanoseconds (ns) to 60ns. Because of its relatively low cost and its large capacity, vendors use DRAM as a system's main memory.

VRAM, *video* random access memory, is another type of RAM found on video adapters. Video RAM is *dual-ported*—it can be accessed by two sources at the same time so your system's CPU can write new data to VRAM while the video adapter's processor reads from VRAM to refresh the display. Overall, VRAM is faster than DRAM (because it's dual-ported) and more expensive.

SRAM, *static* random access memory, requires no power to hold its contents, unlike DRAM and VRAM. It runs at very high speeds—usually 30ns or faster. Speed comes at a price, however. Because of its high cost, SRAM is impractical to use as a system's memory; it's most often used for external caches on system motherboards.

### Help for Slow Printing

I've just upgraded to WordPerfect 6.0 for DOS. I'm running DOS 6 on a 386SX-20 with 5MB of RAM. Now that I've upgraded to the latest release of WordPerfect, documents containing scalable fonts seem to take forever to print. For example, the PRINTER.TST file accompanying the software took over 30 minutes to print on my Canon BJ-200 printer. Can you tell me how to alleviate this problem?

RON LEVESQUE  
ATTLEBORO, MASSACHUSETTS

The biggest part of your problem is the printer, not the program. By design, BubbleJet and ink jet printers can print quickly in DOS-based applications, until you add graphics. The BubbleJet printer treats all those scalable fonts in WordPerfect 6.0 as graphics.

Scalable fonts are downloaded to the printer's RAM buffer. Once the RAM buffer is full, the printer prints the first sequence of the file and clears a portion of its buffer to receive more printing information. The process repeats until the last piece of the file has been sent

through the RAM buffer and your page finishes printing.

The only way to speed up printing is to use the printer's resident fonts.

### Change EDIT.COM's Default

**What must I do to change the default file specification in the DOS 6 version of EDIT.COM?**

MICHAEL FERRY  
BROOMALL, PENNSYLVANIA

Our March 1993 DOS Hot Tips column showed how to alter DOS 5's EDIT command so that the File, Open default file specification changed from \*. to \*.TXT ("Break EDIT.COM's Fixation with TXT Files," page 218). Here's how to change it in DOS 6. First, make a copy of QBASIC.EXE named QBASIC.SAV. Next, type DEBUG QBASIC.SAV to start DEBUG and call up QBASIC.SAV. Then type R at DEBUG's hyphen prompt to display all the CPU register values, and carefully jot down the value of DS. The output from the R command looks something like this, although individual register values may vary:

```
AX=0000 BX=0002 CX=F705 DX=0000
SP=FFFF BP=0000 SI=0000 DI=0000
DS=0DA6 ES=0DA6 SS=0DA6 CS=0DA6
IP=0100 NV UP EI PL NZ NA PO NC
```

In this case, the value stored in the DS register is 0DA6. Now use DEBUG's S command to search the area of memory in which QBASIC.SAV is loaded for the text string TXT, increasing the leftmost digit of the segment address you jotted down earlier each time the search turns up nothing. Here's what the search procedure will look like when the DS register is 0DA6 (this procedure is case sensitive):

```
-S 0DA6:0 1000 "TXT"
-S 1DA6:0 1000 "TXT"
-S 2DA6:0 1000 "TXT"
2DA6:DD72
```

Next, when the Search command responds with an address—you'll get 2DA6:DD72 in the example above—use the address with an E command to change TXT to \*, and then save the file and quit DEBUG, as shown here:

```
E 2DA6:DD72 2A 00 00
W
Q
```



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Finally, rename QBASIC.EXE to QBASIC.BAK and QBASIC.SAV to QBASIC.EXE. Start EDIT and choose File, Open—you should find that EDIT now defaults to \*.\*.

### Keyboard Woes in Windows

**After installing scanner and CD-ROM device drivers on my system, I used MS-DOS 6.2's MemMaker utility to maximize the use of conventional memory on my system. Now the keyboard doesn't work. Have I introduced system conflicts by using MemMaker?**

STEVEN ELLIOTT  
PHOENIX, ARIZONA

It's quite possible. I suspect that MemMaker has loaded something from within your CONFIG.SYS or AUTOEXEC.BAT files into the F000-FFFF range of upper memory, where ROM BIOS normally loads. DOS generally reserves the upper

range of memory—including the Exxx and Fxxx ranges—for adapter RAM and ROM, and the BIOS ROM. Loading other device drivers and programs in this area can inhibit the communication between your CPU and peripherals, especially your keyboard.

So, one of the first things to look at is the EMM386 load line in your CONFIG.SYS. See if this line contains an Include range, such as I=Fxxx-Fxxx, where xxx could be any combination of digits from 000 through FFF. If so, remove the include range from your load line.

You'll need to run MSD (which

Seq #	File	Size	Name	Description/Manufacturer
1	01010000	1000	FILE	FILE
2	01010001	1000	FILE	FILE
3	01010002	1000	FILE	FILE
4	01010003	1000	FILE	FILE
5	01010004	1000	FILE	FILE
6	01010005	1000	FILE	FILE
7	01010006	1000	FILE	FILE
8	01010007	1000	FILE	FILE
9	01010008	1000	FILE	FILE
10	01010009	1000	FILE	FILE
11	0101000A	1000	FILE	FILE
12	0101000B	1000	FILE	FILE
13	0101000C	1000	FILE	FILE
14	0101000D	1000	FILE	FILE
15	0101000E	1000	FILE	FILE
16	0101000F	1000	FILE	FILE
17	01010010	1000	FILE	FILE
18	01010011	1000	FILE	FILE
19	01010012	1000	FILE	FILE
20	01010013	1000	FILE	FILE
21	01010014	1000	FILE	FILE
22	01010015	1000	FILE	FILE
23	01010016	1000	FILE	FILE
24	01010017	1000	FILE	FILE
25	01010018	1000	FILE	FILE
26	01010019	1000	FILE	FILE
27	0101001A	1000	FILE	FILE
28	0101001B	1000	FILE	FILE
29	0101001C	1000	FILE	FILE
30	0101001D	1000	FILE	FILE
31	0101001E	1000	FILE	FILE
32	0101001F	1000	FILE	FILE
33	01010020	1000	FILE	FILE
34	01010021	1000	FILE	FILE
35	01010022	1000	FILE	FILE
36	01010023	1000	FILE	FILE
37	01010024	1000	FILE	FILE
38	01010025	1000	FILE	FILE
39	01010026	1000	FILE	FILE
40	01010027	1000	FILE	FILE
41	01010028	1000	FILE	FILE
42	01010029	1000	FILE	FILE
43	0101002A	1000	FILE	FILE
44	0101002B	1000	FILE	FILE
45	0101002C	1000	FILE	FILE
46	0101002D	1000	FILE	FILE
47	0101002E	1000	FILE	FILE
48	0101002F	1000	FILE	FILE
49	01010030	1000	FILE	FILE
50	01010031	1000	FILE	FILE
51	01010032	1000	FILE	FILE
52	01010033	1000	FILE	FILE
53	01010034	1000	FILE	FILE
54	01010035	1000	FILE	FILE
55	01010036	1000	FILE	FILE
56	01010037	1000	FILE	FILE
57	01010038	1000	FILE	FILE
58	01010039	1000	FILE	FILE
59	0101003A	1000	FILE	FILE
60	0101003B	1000	FILE	FILE
61	0101003C	1000	FILE	FILE
62	0101003D	1000	FILE	FILE
63	0101003E	1000	FILE	FILE
64	0101003F	1000	FILE	FILE
65	01010040	1000	FILE	FILE
66	01010041	1000	FILE	FILE
67	01010042	1000	FILE	FILE
68	01010043	1000	FILE	FILE
69	01010044	1000	FILE	FILE
70	01010045	1000	FILE	FILE
71	01010046	1000	FILE	FILE
72	01010047	1000	FILE	FILE
73	01010048	1000	FILE	FILE
74	01010049	1000	FILE	FILE
75	0101004A	1000	FILE	FILE
76	0101004B	1000	FILE	FILE
77	0101004C	1000	FILE	FILE
78	0101004D	1000	FILE	FILE
79	0101004E	1000	FILE	FILE
80	0101004F	1000	FILE	FILE
81	01010050	1000	FILE	FILE
82	01010051	1000	FILE	FILE
83	01010052	1000	FILE	FILE
84	01010053	1000	FILE	FILE
85	01010054	1000	FILE	FILE
86	01010055	1000	FILE	FILE
87	01010056	1000	FILE	FILE
88	01010057	1000	FILE	FILE
89	01010058	1000	FILE	FILE
90	01010059	1000	FILE	FILE
91	0101005A	1000	FILE	FILE
92	0101005B	1000	FILE	FILE
93	0101005C	1000	FILE	FILE
94	0101005D	1000	FILE	FILE
95	0101005E	1000	FILE	FILE
96	0101005F	1000	FILE	FILE
97	01010060	1000	FILE	FILE
98	01010061	1000	FILE	FILE
99	01010062	1000	FILE	FILE
100	01010063	1000	FILE	FILE

**Programs such as TouchStone Software's CheckIt Pro: Analyst for Windows are useful diagnostic tools that can tell you whether your new memory manager has introduced driver conflicts.**

stands for Microsoft System Diagnostics) to see what regions of upper memory your programs and drivers use. Choose Device Drivers from the MSD menu and look for programs and

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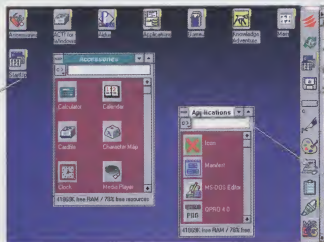
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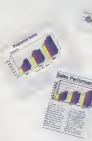


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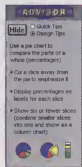
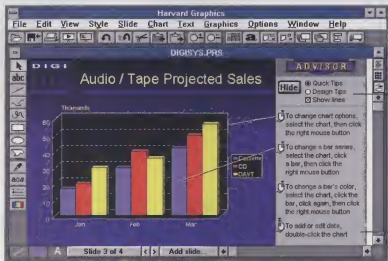
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drivers using the **FFFF** range. When you find them, move them to a different range of memory.

### Switch Box Questions

I have two printers—a LaserJet and a dot matrix—hooked up to my computer with an A-B switch box. A friend told me that I shouldn't use a switch box with a laser printer unless I first powered the printer down. I've been using this setup for about a year with no problems. Is there any potential danger here?

AVERY J. COFFEY  
ANDERSON, INDIANA

Some—but not all—switch boxes provide built-in surge protection for the sometimes delicate internal controllers inside laser printers. If you use a switch box (the kind on which you simply toggle a knob to one position or another) with a Hewlett-Packard LaserJet printer, for example, you

will void your printer's warranty.

Often manufacturers of laser printers will recommend specific features for switch boxes that will not void your warranty. They recommend the following precautions:

1. Choose a metal box, not plastic.
  2. Use shielded cables.
  3. Connect the printer's power cable to a quality surge suppression device.
- Some printer manufacturers will provide a list of approved switch box devices you can use.

### Turn NumLock off at Boot Time

A couple of years ago I saw in your magazine a listing of a utility that turns NumLock off when you boot your system. I never use the ten-key pad for anything but cursor movement, and I'd appreciate a reprint of that nugget.

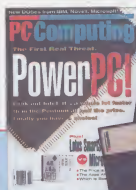
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No problem! This utility is very popular with owners of older machines (the newer BIOSs let you select NumLock's startup mode). To create it, simply type the following lines in any text editor:

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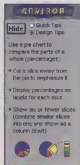
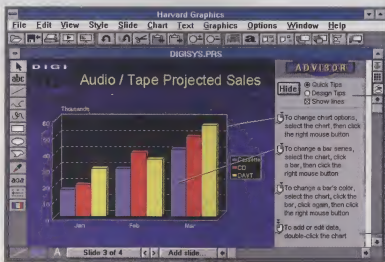


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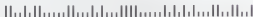
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## Could OLE Automation Be The Princess Charming of Software?

Not yet, but OLE Auto can kiss the DDE frog good-bye.

This Microsoft program manager is in his office well before sunrise. The phone rings. He picks it up. "The Bill" starts screaming. Bawls him out for all the bugs in his product's latest release. Calls him "stupid," the ultimate Microsoft epithet. Furious, the program manager storms out of his office, slams

the door, takes the day off, goes fishin'.

He's out on Lake Snohomish with nary a bite when a frog jumps onto his lap and croaks, "I'm a beautiful princess. Kiss me and I'm yours! Ribbit. Ribbit." He sighs, thinks for a minute, turns the talking frog over a couple of times, and puts it in his pocket, muttering, "I'm at the point where I'd rather have a talking frog."

It's not just frogs doing the talking these days, either. In last month's Toolkit column (page 218) we looked at two old-fashioned methods of getting Windows applications conversing: SendKeys and DDE. We didn't try to write a SendKeys program, because we knew darn well that anything we wrote that would run on our machines probably wouldn't work on yours. SendKeys is so timing dependent, so sensitive to how fast various programs

run on a particular machine, that it's a real crap shoot. Avoid it at all costs.

We did write a DDE program. It was a Visual Basic for Windows program that cranked up a prewritten PrintFileNames macro in Word for Windows. Now it's time for OLE Automation (OLE Auto).

SendKeys is a toad. DDE is a talking frog. OLE Auto is a princess. Or at least a princess wanna-be.

We'll show you how much they differ by rewriting last month's program using OLE Auto instead of DDE. We'll give you some sideline commentary—and fire a few well-deserved potshots—as we go.

In order to run, the DDE implementation required a straightforward 14-line macro in Word for Windows 6.0, and a rather convoluted 18-line program in Visual Basic. Watch how things change with OLE Auto.

First, you'll have to upgrade to the latest versions of Visual Basic and Word for Windows: Visual Basic 3.0 works as an OLE Auto client; Word for Windows 6.0 works as an OLE Auto server. Earlier versions of both programs would speak DDE, but not OLE Auto.

Crank up Visual Basic. We'll need a little form that runs a variant of the old PrintFileNames macro. Double-click on the oval command button in the Toolbox (in the screen at left, it's the last icon on the second row). Stretch and drag the resulting push-button a bit, and type in something witty like "Print Current Directory." You should have a form that looks like the one shown above, right.

Double-click on the Command Button again, and Visual Basic will whisk you away to the programming editor, so you can write a program to respond to the user clicking this push-button. Type in



It's not pretty, but it gets the job done: Click once on the push-button and type "Print Current Directory." You'll write the code later.

the OLE Auto program listed in the screen shot on page 226.

Let's step through that program. The Dim and Set lines tell Visual Basic that you want MyWord to be associated with Word for Windows as an OLE Auto server. In addition, the Set statement cranks up Word for Windows, and gets it ready to do OLE.

The next line tells Visual Basic that you want to run the WordBasic command FileNew. Then the program sticks "Files in " into the document (the WordBasic command Insert puts stuff into a document), followed by the name of the current directory, ending with a paragraph mark.

If you're a WordBasic fan, you'll know that the function Files\$(".") returns the name of the current directory. Perhaps surprisingly, Visual Basic croaks if you try a command like MyWord.Files\$("."); It can't take the dollar sign. The workaround is to discard dollar signs on the ends of any WordBasic functions. Nope, the official documentation doesn't tell you that. Yep, it works.

The next line in the program, FName\$ = MyWord.Files\$("\*.\*") presented a real conceptual hurdle for us. We wanted to set up a variable *inside* Word for Windows to take care of filenames, but there's no way to do it! The solution was to pull a value out of Word for Windows—in this case, the value of Files\$("\*.\*")—and assign that value to FName\$, a variable *inside* Visual Basic. By the way, the WordBasic function



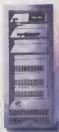
Visual Basic's toolbox has an oval-shaped button for creating push-buttons in your application. Double-click to begin your Visual Basic odyssey.





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Files\$("\*.\*") returns the name of the first file in the current directory.

The While loop puts a filename followed by a paragraph mark into the document, then looks for another file. (That's what repeated calls of the WordBasic function Files\$() will do.) By the time the While loop is done, the Word for Windows document contains a list of all files in the current directory.

Then we print the document and close it without saving (in WordBasic the 2 in DocClose says "don't save"). Finally, setting MyWord to Nothing releases the MyWord "object" and gracefully closes Word for Windows.

Ready? OK. Go at it. Select File, Save Project, and give your Visual Basic program a name. Next, click on the right-wedge (Play) button to run it. Click on the Print Current Directory push-button and watch while your disks whirl and gnash and moan a bit. Word for Windows gets cranked up (you'll probably see it on your screen), the document gets stuffed with filenames, the funny little animated print icon at the bottom of the Word screen starts showing funny little animated pages flowing through your printer, then Word for Windows disappears and all is well.

Uh. Maybe not. *Oh, criminy!* Bugs again. As if we haven't paid enough dues at the WinGods' sacrificial table . . .

Judging from a rather small sample, our guess is that there's at least a 50 percent chance that this macro will run just fine, look great, complete normally, then *print absolutely nothing*.

We finally found the problem. In certain situations, when Word for Windows

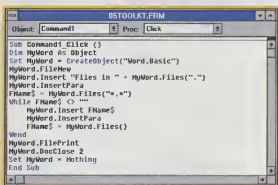
is running fast and Print Manager is running slow, and Word has background printing turned on, the Word object will get clobbered before background printing is done and the print job will disappear. Poof. No warning. No notice. No nothin'. The solution is in "Print Current Directory Code," below.

In the new code, we picked up the current Word for Windows Tools/ Options/ Print values, and put them in an object called top. Then we pulled out the current value of the Background Printing check box. (If you go into WordBasic, type ToolsOptionsPrint, and hit F1, you'll see "Background" listed as the official name of this setting.)

Next, we turned background printing off, with that 11-comma monstrosity you see there, making sure that we reset it to its original value before leaving Word for Windows.

Behind those commas lies quite a story. OLE Auto forces you to use positional parameters—you can't say something sane like .Background=1, as you can in WordBasic—but you're forced to tell OLE Auto, "I want to change the 12th parameter of the ToolsOptionPrint dialog." Nothing like a sophisticated programming language, eh?

How did we find out that Background Printing is the 12th parameter? The Word for Windows official documentation and the F1 online help both list



Here's our first attempt at getting Visual Basic to print a list of the current directory in Word for Windows using OLE Auto. It might work for you—then again, it might not.

background printing as the fifth parameter; it's also the fifth check box in the Tools/ Options/ Print dialog box. We tried it and it didn't work. (You're surprised?) Nor did the fourth or sixth parameters. We were finally forced to try every bloody position from 1 to 12, before we found the one that worked.

Does your code keep giving you an OLE Auto error message? Try shutting down Windows, restarting, then running the program. We aren't sure, but our guess is that the Set = command is leaving something in the ether. Jeeze. OLE may be a Version 2.0 product, but OLE Auto is definitely still Version 1.0, subject to the legendary Microsoft Version 1.0 blues. It really shows. ☐

*Woody's Underground Guide to Word for Windows* (Addison-Wesley, 1994) just hit the stands. No Word for Windows guru should be without it. Be sure to bug Woody at 72241,2125 and Vince at 76636,415 on PC/Contact. Pun intended.

## PRINT CURRENT DIRECTORY CODE

It took us a while, but we finally got a version of our Visual Basic code to work around OLE Auto's many quirks. Add the following lines between Sub Command1\_Click() and End Sub.

```
Dim MyWord As Object
Set MyWord = CreateObject("Word.Basic")
MyWord.FileNew
MyWord.Insert "Files in " + MyWord.Files(".")
MyWord.InsertPara
FName$ = MyWord.Files("*.*")
While FName$ <> ""
    MyWord.Insert FName$
    MyWord.InsertPara
    FName$ = MyWord.Files()
Wend
Dim top As Object
Set top = MyWord.CurValues.ToolsOptionsPrint
CurrBkgd = top.Background
MyWord.ToolsOptionsPrint , , , , , , , , , , , , , 0
MyWord.FilePrint
MyWord.DocClose 2
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Set MyWord = Nothing
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*By Marty Jerome*



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Computer Discount Warehouse	271-2, 275	M-F 7:30-7:30; Sat 9-5 (CST)	800-473-4CDW
Dee-One Systems	276	M-F 8-6; Sat 10-4 (PST)	800-831-8808
Envisions	284-286	M-F 6:30-5; Sat 9-1 (PST)	800-926-7226
First Source	270	M-F 8-5; Sat 9-3 (PST)	800-301-9866
Insight	252	24 Hours	800-927-3159
L.A. Trade	238	M-F 8-5; Sat 10-12 (PST)	800-433-3726
Megahaus	254	M 8-8; TU-F 8-7; Sat 9-3 (CST)	800-786-1187
Midwest Micro	277-281	M-F 9-7; Sat 10-4	800-682-7248
PC's Compleat	245-247	M-F 24 Hours; Sat-Sun 10-8 p.m.	800-598-4727
USA Flex	268-269	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
<b>PRINTERS</b>			
Arlington Computer Products	258-259	M-F 7:30 - 7:30; Sat 9-5 (CST)	800-548-5105
Computability	233-5, 237	M-F 8-8; Sat 9-5 (CST)	800-554-9952
Dee-One Systems	276	M-F 8-6; Sat 10-4 (PST)	800-831-8808
USA Flex	268-269	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
<b>SOFTWARE</b>			
Computability	233-5, 237	M-F 8-8; Sat 9-5 (CST)	800-554-9952
Computer Discount Warehouse	271-2, 275	M-F 7:30-7:30; Sat 9-5 (CST)	800-473-4CDW
Dustin Discount Software	253	M-F 6-5; Sat 10-12 (PST)	800-274-6611
Landmark	228	M-T 8-9; F 8-6; Sat 10-3	800-683-6696
USA Flex	268-269	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
<b>MEMORY</b>			
First Source	270	M-F 8-5; Sat 9-3 (PST)	800-301-9866
L.A. Trade	238	M-F 8-5; Sat 10-12 (PST)	800-433-3726
WorldWide Technology	283	M-F 9 - 7:30; Sat 10-6	800-636-6792
<b>NOTEBOOKS</b>			
Bondwell	282	M-F 7-7; Sat 9-4	800-627-6888
Computability	233-5, 237	M-F 8-8; Sat 9-5 (CST)	800-554-9952
Innovation/Sunshine Computers	264	M-F 9-9; Sat 10-6; Sun 12-5	800-828-2992
Insight	252	24 Hours	800-927-3159
Midwest Micro	277-281	M-F 9-7; Sat 10-4	800-682-7248
PC's Compleat	245-247	M-F 24 Hours; Sat-Sun 10-8 p.m.	800-598-4727
SAGER	266-267	M-F 7-6; Sat 9-3 (PST)	800-669-1624
USA Flex	268-269	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
<b>TRAINING PROGRAMS</b>			
Computer Book Club	255-257	M-F 8-5	717-794-2191
<b>STORAGE</b>			
Insight	252	24 Hours	800-927-3159



# Spec Watch

## Network Printers Demand Wide LAN Support and Speed, Speed, Speed

*Seventeen pages per minute is now the standard, so plug one in and go.*

Think of your network printer as O'Hare Airport. When traffic stacks up in a holding pattern, tempers flare. Productive hours slow to a crawl in the print queue. Work stalls cold, often for six or more people at a time.

There are only two ways to prevent this: Get documents to land faster with a speedier printer, or reroute traffic to another machine. Either way, you'll want to make sure that you don't run into the same backlog six months later.

A host of issues determine printer throughput, beginning with print-engine speed itself. Dollar for dollar, 17-page-per-minute printers offer the best bargains today; their prices have declined 30 percent in the past year. This is the minimum speed you'll want for a medium-sized LAN.

To ensure that your printer can process pages at full throttle, look for models with a fast RISC processor and stock the printer with a minimum of 8MB of RAM. And

make sure that it has 90 or more resident fonts, including a wide selection of TrueType and PostScript fonts. After all, when someone downloads soft fonts from a system, it slows the show.

Equally important are direct network connections—10BaseT or 10Base2 Ethernet, Token Ring, or LocalTalk (for quick Macintosh connections). Not only do network connections send data to the printer far faster than parallel ports do, but they

eliminate the need for a dedicated print server. Also make sure the printer supports bidirectional communication so that paper jams and empty toner cartridges receive immediate attention.

Finally, you'll want to make sure your printer adapts to your changing needs. Look for concurrent support for all the network operating systems you use, which may include NetWare, Windows NT, Windows for Workgroups, LAN Server, and TCP/IP.

Interfaces: Parallel, and 10BaseT or 10Base2 Ethernet, Token Ring, or LocalTalk.

Network support: Concurrent for Novell NetWare, Windows NT, Windows for Workgroups, LAN Server, and TCP/IP.

Print engine speed: At least 17 ppm.

Processor: 16MHz RISC.

RAM: 8MB.

Paper capacity: 1,000 sheets.

Warranty: One year with onsite service.

Features and options: SNMP support, EPA Energy Star compliance, legal-size paper tray.

Emulations: PCL 5, PostScript Level 2 with automatic emulation switching.



Resolution: 600 dots per inch.

Resident fonts: 90 total; 10 TrueType (matching Windows 3.1), 45 PCL 5, 35 PostScript.



## Don't settle for less than these specs:

### Sound Cards

Compatibility: Sound Blaster.

Mode: Stereo.

Card type: Internal.

Sampling capability: 16-bit record and play (MPC 2 standard).

Maximum sampling rate: 44.1kHz.

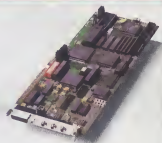
Synthesizer: Wave or FM with Wave option.

Bundled software: Windows and DOS utilities for playing, recording, and editing digital and MIDI files.

Ports: Speaker, microphone, and joystick.

Features and options: Programmable digital-signal processor for compression, SCSI port for a CD-ROM drive, and QSound Virtual Audio.

**Red flags:** Cards that play but can't record 16-bit sound or have a proprietary (non-SCSI) CD-ROM interface may be less useful.



### Windows Accelerator Cards

Resolutions: 1,024 by 768; 1,280 by 1,024 for 20-inch monitors.

Colors: 256 colors at 1,024-by-768 resolution for business apps; 65,000 colors at 1,024 by 768 for near-photo-quality images.

Accelerator chip: Fixed-function chip such as S3 928, IIT AGX014, or ATI 68800 (Mach 32).

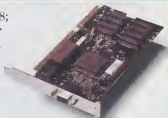
Vertical refresh rates: 72Hz at all resolutions.

RAM: 1MB for 256 colors at 1,024 by 768; 2MB or more for higher resolutions and more colors.

Features and options: VL-Bus or PCI model option, Windows utility to switch resolutions and colors.

Other requirements: Driver installation software, two-year warranty, Windows 3.1 drivers, free driver updates via BBS, CompuServe, or mail.

**Red flags:** Interlaced boards and boards with 70Hz (or lower) vertical refresh rates produce more flicker.



### Desktop Systems

CPU: Intel 486DX2/66 upgradable.

Secondary cache: 256K four-way set-associative.

Memory: 8MB, expandable to 32MB, 36-pin SIMMs.

Hard drive: 230MB or larger IDE.

Video: VL-Bus or PCI Windows accelerator, 15-inch monitor or larger with 72Hz refresh at 1,024 by 768 pixels.

Slots: Eight ISA slots for full-size case (including two VL-Bus or PCI), three ISA slots for small-footprint case with integrated VL-Bus or PCI video and drive.

Drives and bays: One 3½-inch 1.44MB and one 5¼-inch 1.2MB floppy drive, five half-height 5¼-inch bays.

**Red flags:** Pentium-upgradable systems should include CPU, secondary CPU cache, and lots of slots for extra RAM.



### Notebook PCs

CPU: 33MHz 486.

Display type: 9½-inch or larger backlit dual-scan passive-matrix or active-matrix color LCD with accelerated local bus.

Weight: Under 7 pounds without AC adapter; total traveling weight under 9 pounds.

Size: Smaller than 10 by 12 by 2 inches.

RAM: 8MB, expandable to 20MB.

Hard drive: 120MB.

Ports/slots: Parallel, 9-pin serial, PS/2 ports; one PCMCIA Type III slot or two Type II slots.

Features and options: Ability to swap out floppy drive for second battery, removable hard drive, user-installable RAM, integrated pointing device.

Other requirements: Standby mode, pop-up battery gauge, 6-by-3-by-3-inch battery recharger.





# Winner of 8 Best Buy Awards in 1993!



**Best Sound Card**  
Sound Blaster 16-ASP

**Best Input Device**  
Microsoft Mouse 2.0

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Procomm Plus for Windows

**Best Presentation**  
Corel Draw 3.0

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Quicken 2.0/Windows

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**FREE Prodigy Starter Kit with purchase of any Zoom Modem!**

### V.32 bis Voice FaxModem for Windows & DOS

*Voice storage and playback with 14400 bps send/receive fax and data*

Zoom now offers voice in a high-speed faxmodem at a surprisingly low price. Voice greatly expands the capabilities of faxmodems with functions like voice mail, voice delivery and fax on demand. Includes SuperVoice and COMit for Windows, BitFax/Voice for DOS.

**Internal 14400 bps Voice FaxModem \$149**

**External 14400 bps Voice FaxModem \$175**

VFP V.32bis 14400 bps Internal **\$129**

VFX V.32bis 14400 bps External **\$149**



*Best in February 1994 Computer Shopper Roundup Winner of Window Sources "Expert Pick" Award*

### Zoom V.Fast Class 28.8 bps

The Zoom FaxModem VFX 28.8 internal provides an amazing 28.8 thousand bps uncompressed data transmission over conventional telephone lines with automatic dropback to V.32bis. The 28.8 uses V.Fast Class transmission protocols to obtain extremely fast data transfer rates and higher connect rates with quicker negotiation than V.32bis at 14,400 bps.

**VFX 28.8K Internal \$195**

**VFP 28.8K External \$229**

### ZoomFaxModem 14.4 PC Int. / EX External

The Zoom FaxModem 14.4 is a Group 3, Class 1 and 2, 14,400 bps send/receive fax and full-featured Hayes compatible 14,400 bps modem. Unlike many of Zoom's other high-speed faxmodems, the 14.4 does not have hardware-based V.42 error correction or V.42bis compression. Instead it implements V.42, V.42bis, and MNP 2-5 using RPI, the Rockwell Protocol Interface, a standard developed by the world's largest modem chip company. RPI-based V.42, V.42bis and MNP work just like hardware V.42, V.42bis and MNP when used with RPI compatible data communications software. The software included with this faxmodem is fully RPI compatible, as are many other popular communications software packages.

**PC \$99 EX \$129**



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Within minutes, you can turn your ideas into precise designs! DesignCAD comes complete with: 500 symbols, dimensioning, drafting and editing toolboxes, materials list, scaling, zoom, layers, and support of 7 file formats.

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WINDOWS DOS 6.0



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#### 535 Internal

- Exceeds MPC2 & QuickTime standards
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while supplies last!

The New Grolier Multimedia Upgrade for '94  
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Chicon 535 External	\$395	\$425	\$520	\$545	\$565	\$599	add \$79
Mitsumi FX001D	\$175	(with Sound Blaster 16 MCD = \$340 or 16 MCD ASP = \$345)					add \$79
NEC 33X Internal	\$459	\$519	\$584	\$589	\$609	\$643	add \$79
NEC 33X External	\$539	\$599	\$664	\$689	\$709	\$743	add \$79
NEC 4X	\$939	Quadruple Speed!	Quantities Limited - Call Now!				add \$79
Plextor 3028i Internal	\$279	\$339	\$404	\$409	\$429	\$463	add \$79
Plextor 5028e External	\$369	\$439	\$504	\$529	\$549	\$583	add \$79
Sony CDU-33A	\$179	(with Sound Blaster 16 MCD = \$304 or 16 MCD ASP = \$338)					add \$79
Toshiba 3401B Internal	\$315	\$375	\$440	\$445	\$465	\$499	add \$79
Toshiba 3401A External	\$415	\$475	\$540	\$565	\$585	\$619	add \$79
Toshiba 4101 Internal New!	\$209	\$269	\$334	\$339	\$359	\$383	add \$79

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- Special One Bundle Deal!
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- Mario's Missing - Early Years
- Maya's Beacon 3.0 MPC
- Maya's Beacon for Windows
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- ROM Material
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- Saleswater Jukebox
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- Space Quest 4
- Space Shuttle 1980
- Sports Illustrated Almanac
- Star Wars Chess MPC
- Time Table of History
- Science & Innovation
- To Many Tapes
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- US Atlas w/Video MPC
- US Presidents
- Wine Pod
- Windows
- World Map V.4 w/Video MPC

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Single User (750-15)... \$85  
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**InfoNetwork Personal Network**  
Starter Kit for 2 Users (750-17)... \$259  
**InfoNetwork Personal Network**  
Expansion Kit for 4 User (750-18)... \$145

## ARTISOFT

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Starter Kit (930-04) \$40  
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NodeRunner 2000A Coax (909-55)... \$200  
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NodeRunner 2000T 10Base-T (909-54)... \$160  
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### NEC

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### TEXAS INSTRUMENTS

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486SX200 486S10MB... \$1,750

### NEW LOWER PRICES!

### Free Prodigy Starter Kit with purchase of any Zoom Model!

V 10 p See Prodigy 1000 for details  
V 10 p See Prodigy 1000 for details  
V 10 p See Prodigy 1000 for details  
V 10 p See Prodigy 1000 for details  
V 10 p See Prodigy 1000 for details  
V 10 p See Prodigy 1000 for details  
V 10 p See Prodigy 1000 for details  
V 10 p See Prodigy 1000 for details

### Supra Corporation

486SX200 486S10MB... \$1,750  
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### Future Systems

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### Speakers

### intel.

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### AT&T

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### TAPE BACK UP

### COMPAQ

486SX200 486S10MB... \$1,750  
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486SX200 486S10MB... \$1,750  
486SX200 486S10MB... \$1,750

## HARD DRIVES

### Seagate

ST-512 1 MB... \$239  
ST-512 1 MB... \$239  
ST-512 1 MB... \$239  
ST-512 1 MB... \$239  
ST-512 1 MB... \$239  
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### Maxtor

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### Quantum

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### MICROPLUS

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### WESTERN DIGITAL

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### CONTROLLERS

### adaptec

486SX200 486S10MB... \$1,750  
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### Qlogic

486SX200 486S10MB... \$1,750  
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### NEW!

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### FUTURE

486SX200 486S10MB... \$1,750  
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### OTHER

486SX200 486S10MB... \$1,750  
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## MONITORS

### CTX

5304 14" 564MB... \$209  
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### SONY

5304 14" 564MB... \$209  
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### NANO

5304 14" 564MB... \$209  
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### SCANNERS

486SX200 486S10MB... \$1,750  
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### LOGITECH

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### EPSON

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### POWER SUPPLY

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### LOWER PRICES!

### Seagate

486SX200 486S10MB... \$1,750  
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### FLOPPY DRIVES

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### TEAC

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### MOODES:

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### TOKEN RING:

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### MEMORY CARD:

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### HARD DRIVE:

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486SX200 486S10MB... \$1,750  
486SX200 486S10MB... \$1,750  
486SX200 486S10MB... \$1,750  
486



## Don't settle for less than these specs:

### Windows Displays

**Size:** 17 inches; 20 to 21 inches for graphics applications.

**Resolutions:** 1,024 by 768; 1,280 by 1,024 for 20- or 21-inch monitors; noninterlaced.

**Dot pitch:** 0.28mm for 17-inch monitors; 0.31mm for 20-inch.

**Vertical refresh rate:** 72Hz or higher at all resolutions.

**Tube type:** Flat-square or Trinitron.

**Controls:** Front-panel digital image controls.

**Features and options:** Support for MPR II low-emissions standards, compliant with EPA Energy Star requirements.

**Other requirements:** Adjustable tilt-and-swivel base, video cable, antiglare coating or add-on filter.

**Red flags:** Monitors with dot pitch above 0.31mm may seem fuzzy.



### Hard Drives

**Performance:** 13ms or faster vendor-rated average access time. If performance reported as average seek time: 10ms or faster.

**Capacity:** 230MB or greater.

**Size:** Half height or full height, depending on your system's drive space.

**Interface:** IDE for desktop systems with up to 1GB of capacity. For larger capacities, get a SCSI-2 drive interface.

**Features and options:** Self-parking heads, diagnostic and partitioning software.

**Cache or buffer:** 64K to 256K.

**Red flags:** Mounting brackets and cables should come with the disk; look for a 30-day full money-back guarantee and a three- to five-year warranty.



### CD-ROM Drives

**Access time:** 200ms.

**Transfer rate:** Dual-speed drive: 150 Kbps to 300 Kbps.

**Ondrive cache:** 64K.

**Interface:** SCSI-2.

**Compatibility:** High Sierra (data) and ISO-9660, CD-Audio, and Kodak Photo CD (still photography) with multisession support (MPC 2).

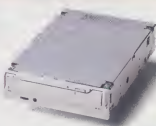
**Audio:** Output jack and volume control.

**Packaging:** Internal.

**Features and options:** Bundled CD-ROM discs, single-handed operation.

**Other requirements:** Disk caddy (if needed).

**Red flags:** Proprietary interfaces and drives that don't support MPC 2 will probably be compatible with fewer software and hardware products.



### Desktop Laser Printers

**Emulations:** PCL 5, PostScript option with automatic emulation switching and all ports active.

**Print engine speed:** 8 ppm.

**Resolution:** 600 dpi.

**Resident fonts:** 45 total; 10 TrueType fonts (matching Windows 3.1).

**RAM:** At least 2MB.

**Interface:** Bidirectional parallel.

**Paper capacity:** 200 sheets.

**Footprint:** 260 square inches or less.

**Features and options:** HP-compatible font cartridges, RISC processor for 600-dpi models, toner included, EPA Energy Star compliance.

**Other requirements:** Toner cartridge, parallel cable, envelope tray.





## SOFTWARE

[illegible]

### Best Overall Software Supplier

## WHERE THE TOP 50

## SOFTWARE TITLES ARE ALWAYS ON SUPER SALE

1. MS Word 6.0 for Windows .....	299.95	26. MS Works 3.0 Win .....	119.95
2. MS Excel 6.2 .....	49.95	27. Corel Draw 3.0 for Windows .....	129.95
3. MS Word 5.0 for Windows .....	304.95	28. Claris File Maker Pro 2.1 .....	119.95
4. MS PowerPoint 4.0 for Windows .....	304.95	29. Turbojet 93 Headstart for DOS or Win .....	49.95
5. WordPerfect 6.0 DOS .....	284.95	30. Quattro Pro 5.0 for DOS .....	49.95
6. Lotus 123 Release 4 for Windows .....	294.95	31. Quicken 3.0 for Windows .....	49.95
7. Paradox 4.5 for Windows .....	138.95	32. MS Arcade 1.0 for Windows .....	29.95
8. Qemm 7 .....	62.95	33. Visio 2.0 for Windows .....	119.95
9. Quattro Pro 5.0 for Windows .....	42.95	34. Encarta Encyclopedia - CD .....	39.95
10. MS Windows 3.1 .....	88.95	35. Corel Draw 4.0 for Windows .....	37.95
11. Procomul Plus 1.02 for Windows .....	93.95	36. Quicken Companion 2 .....	29.95
12. MS Access 1.1 for Windows .....	299.95	37. MS PC Works 3.0 for DOS .....	99.95
13. Procomul Plus 2.01 for DOS .....	68.95	38. Hijack Pro 2.0 Windows .....	79.95
14. After Dark for Windows V.2.0 .....	29.95	39. MS Windows NT 3.1 .....	29.95
15. MS Publisher 2.0 for Windows .....	122.95	40. WordPerfect 6.0 for Windows .....	289.95
16. Disney Screen Saver for Win .....	28.95	41. Lantastic AI 5.0 Win/DOS .....	29.95
17. MS Office 4.0 for Windows .....	459.95	42. MS Windows for Workgroups 3.11 .....	139.95
18. Norton Utilities 7.0 .....	111.95	43. Compuserve Win Membership 2 .....	29.95
19. MS Flight Simulator 5.0 .....	43.95	44. MS Visual Basic 3.0 for Win Stand .....	129.95
20. Quicken 7.0 for DOS .....	42.95	45. Rebel Assault - CD .....	49.95
21. WinFax Pro 3.0 for Windows .....	78.95	46. Lotus Notes 3.0 Client for Windows .....	40.95
22. PC Anywhere V.4.5 Host & Remote .....	1129.95	47. MS Money 3.0 for Windows .....	29.95
23. Approach 2.1 for Windows .....	97.95	48. MS Visual C++ Stand for Win 3.5 .....	129.95
24. Print Cache 3.1 .....	46.95	49. MS Cinema '94 - CD .....	49.95
25. OS/2 2.0 for Windows .....	49.95	50. Netware 1.0 .....	49.95

**LOOK HERE FIRST FOR EXTRA SAVINGS  
(TOP 50 TITLES NOT LISTED BELOW)**



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## SOFTWARE

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- If so, you will be billed additional.
- \* Call for Free Catalog & Items not listed.

Personal & company checks allow 14 working days to clear. Not responsible for typographical errors. Prices fluctuate beyond our control & may change for better or worse. Defective returns must have a Return Authorization number. Call our 1-800 number to obtain a Return Authorization or your return will not be accepted. Shipping & Handling non-refundable. All sales are final. All returns are subject to a restocking fee.

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FOR MC, VISA & DISCOVER

# MEMORY

## CACHE MEMORY

	128K	256K	512K	1024K
8048	5.95	8.99	8.99	8.99
8048C	25.00	11.00	8.00	7.00
8048C1	-	11.00	8.00	7.00
18048	-	-	7.00	8.00
18048C	-	-	8.00	30.00

## Individual D-RAM Chips

MEMORY AVAILABLE IN APPLE		INTEL Math Chips	
ITEM	PRICE	ITEM	PRICE
18464	25.00	8087-2	45.00
18464C	25.00	8087-2	45.00
18464C1	25.00	8087-2	45.00
18464C2	25.00	8087-2	45.00
18464C3	25.00	8087-2	45.00
18464C4	25.00	8087-2	45.00
18464C5	25.00	8087-2	45.00
18464C6	25.00	8087-2	45.00
18464C7	25.00	8087-2	45.00
18464C8	25.00	8087-2	45.00
18464C9	25.00	8087-2	45.00
18464C10	25.00	8087-2	45.00
18464C11	25.00	8087-2	45.00
18464C12	25.00	8087-2	45.00
18464C13	25.00	8087-2	45.00
18464C14	25.00	8087-2	45.00
18464C15	25.00	8087-2	45.00
18464C16	25.00	8087-2	45.00
18464C17	25.00	8087-2	45.00
18464C18	25.00	8087-2	45.00
18464C19	25.00	8087-2	45.00
18464C20	25.00	8087-2	45.00
18464C21	25.00	8087-2	45.00
18464C22	25.00	8087-2	45.00
18464C23	25.00	8087-2	45.00
18464C24	25.00	8087-2	45.00
18464C25	25.00	8087-2	45.00
18464C26	25.00	8087-2	45.00
18464C27	25.00	8087-2	45.00
18464C28	25.00	8087-2	45.00
18464C29	25.00	8087-2	45.00
18464C30	25.00	8087-2	45.00
18464C31	25.00	8087-2	45.00
18464C32	25.00	8087-2	45.00
18464C33	25.00	8087-2	45.00
18464C34	25.00	8087-2	45.00
18464C35	25.00	8087-2	45.00
18464C36	25.00	8087-2	45.00
18464C37	25.00	8087-2	45.00
18464C38	25.00	8087-2	45.00
18464C39	25.00	8087-2	45.00
18464C40	25.00	8087-2	45.00
18464C41	25.00	8087-2	45.00
18464C42	25.00	8087-2	45.00
18464C43	25.00	8087-2	45.00
18464C44	25.00	8087-2	45.00
18464C45	25.00	8087-2	45.00
18464C46	25.00	8087-2	45.00
18464C47	25.00	8087-2	45.00
18464C48	25.00	8087-2	45.00
18464C49	25.00	8087-2	45.00
18464C50	25.00	8087-2	45.00
18464C51	25.00	8087-2	45.00
18464C52	25.00	8087-2	45.00
18464C53	25.00	8087-2	45.00
18464C54	25.00	8087-2	45.00
18464C55	25.00	8087-2	45.00
18464C56	25.00	8087-2	45.00
18464C57	25.00	8087-2	45.00
18464C58	25.00	8087-2	45.00
18464C59	25.00	8087-2	45.00
18464C60	25.00	8087-2	45.00
18464C61	25.00	8087-2	45.00
18464C62	25.00	8087-2	45.00
18464C63	25.00	8087-2	45.00
18464C64	25.00	8087-2	45.00
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18464C74	25.00	8087-2	45.00
18464C75	25.00	8087-2	45.00
18464C76	25.00	8087-2	45.00
18464C77	25.00	8087-2	45.00
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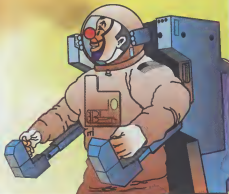
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Dot Pitch	N/A	28mm	28mm	28mm	26mm
100-240 VAC (Auto-sensing)	Yes	Yes	Yes	Yes	Yes
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4/33 Model 123W	120MB	\$1229
4/33 Model 173W	170MB	\$1359
4/33 Model 213W	210MB	\$1539
4/66d Model 213W	210MB	\$1979

\*Monitors sold separately  
Lease for \$50/mo.

**\$999\***



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▲ 13" x 9" x 2" leather carrying case for 15" laptop  
▲ 13" x 9" x 2" leather carrying case for 15" laptop  
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**XJACK 14.4/14.4**

**\$299.99**

Model	Price
Model XJ2144 14.4/14.4 4-GOLD	\$299.99
CC1414 14.4/14.4 4-GOLD	\$299.99
XJ185M 86/96	\$299.99
XJ124M 24/96	\$179.99
CC3144 14.4/14.4	\$299.99
P2144	\$299.99

\*Monitors sold separately  
Lease for \$50/mo.

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Never a Restocking Fee	YES	YES
30-day Price Protection	YES	YES
PC Computing Five Star Award	YES	YES
Lifetime Toll-Free Technical Support	YES	YES
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FREE Software Installation	YES	YES
Same Day Shipment	YES	YES
Pre-installed Software Discount	YES	YES
All Major Credit Cards Accepted	YES	YES
Never a Hidden Surcharge	YES	YES
\$4.95 Shipping on Most Peripherals	YES	YES
Compaq Authorized for Direct Marketing	YES	YES
90 Days Same As Cash	YES	YES
Low Cost Business Leases	YES	YES
Volume Purchase Agreements	YES	YES
FREE Asset Tagging	YES	YES
Customer Satisfaction Is Top Priority	YES	YES



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# NEC: Versatility

**NEC Versa E  
DX4/75 - 340  
Now Available**

## MultiSync Monitors

View the latest in the line of award-winning monitors, which include a 3-year warranty!

### 3V

- ▲ 15" SVGA
- ▲ 1024x768, 28mm NI
- ▲ 72MHz VESA refresh rate
- ▲ MPR II, EnergyStar compliant
- ▲ Great for Entry-level business/Windows applications



**\$469.99**

### 5F6p

- ▲ 17" SVGA
- ▲ 1280x1024, 28mm NI
- ▲ Opticlear surface
- ▲ Intelligent Power Management System
- ▲ Great for entry-level CAD, color desktop publishing



**\$1109.99**

### 6F6p

- ▲ 21" SVGA
- ▲ 1280x1024, 28mm NI
- ▲ Opticlear surface
- ▲ Intelligent Power Management System (IPM)
- ▲ Great for professional CAD/CAM/CAE, graphic design, color desktop publishing

**\$2019.99**

# NEC

## UltraLite Versa E

▲ 486 processor			
▲ 4MB RAM, expandable to 20MB			
▲ 2 Type II PCMCIA slots			
▲ MS-DOS 6.2, Windows 3.1, built-in trackball			
Processor	Screen	Hard drive	Price
DX2/40	Active color	120MB	\$3819
DX2/40	Active color	250MB	\$4229
DX2/50	Monochrome	209MB	\$3259*
DX2/50	Active color	209MB	\$4499
DX2/50	Active color	340MB	\$4919
DX4/75	Active color	340MB	\$5229

Lease for

**\$3259\***

## UltraLite Versa E

The Versa E notebook series is upgradeable to grow with your needs. For ease of upgrade and service, the UltraLite Versa's floppy drive, hard disk drive and memory card slide in and out of their storage slots. If you require extended battery life, slide out the Versa's floppy drive, pop in a second battery, and double your time on the road.



## Ready Multimedia Desktops

Get Ready for an impressive multimedia system from NEC. The Ready 425CD2 and Ready 433CD3 feature built-in ready-to-run CD-ROM readers, a complete sound system, and a comprehensive software offering to introduce you to multimedia computing. Also sporting local bus graphics and 24-bit true color, the multimedia Ready will speed through your applications and display them in bright, clear colors.



**\$120/mo.**

## Ready Multimedia Desktop

- ▲ 4MB RAM expandable to 36MB
- ▲ 9600/4800 fax, 2400 data modem
- ▲ Fast double or triple speed CD-ROM
- ▲ MediaVision sound card, speakers
- ▲ MS-DOS, Windows 3.1, America-On-Line, CompuServe
- ▲ CD-ROM titles include: PFS: Windows, Compton's Encyclopedia, Dinosaur Adventure and Space Adventure

Processor	Hard drive	Price
486SX/25	170MB	\$149
486SX/33	250MB	\$159

NEC SVGA monitor \$319.99  
Lease for \$55/mo.

**\$1499\***

## PowerMate Desktops

- ▲ 4MB RAM expandable to 36MB
- ▲ 8KB cache expandable to 256KB
- ▲ Local bus True Color video
- ▲ Graphics accelerator
- ▲ 3 expansion slots, 3 drive bays
- ▲ MS DOS, Windows 3.1, NEC mouse

Processor	Hard drive	Price
486SX/33	170MB	\$1129*
486DX2/50	210MB	\$1399
486DX2/66	210MB	\$1749

NEC SVGA monitor \$319.99  
Lease for \$55/mo.



## PowerMate Desktops

Meeting your needs for aggressive and outstanding quality, the PowerMate 486 series features local bus video and graphics accelerator to deliver falcon-like speed. By combining 486 processing power with local bus video and True Color support, the PowerMate takes you to new heights in performance.

## NEC MultiSpin 3X CD-ROM Drives

New from NEC—the fastest CD-ROM Drives available

- ▲ Triple speed 450Kb/sec transfer rate, 195ms access time & 256K buffer
- ▲ MPC Level 2 compliant, Multisession Photo CD & XA-compliant
- ▲ Sleek new design features front panel LCD controls for display of data, audio & diagnostics data
- ▲ Full audio control buttons (play, repeat, track advance, pause, stop) on front panel for your music CDs. And play audio CDs without a PC.
- MultiSpin 3Xp Portable Drive \$429.99
- MultiSpin 3Xi External Drive \$479.99
- MultiSpin 3Xe Internal Drive \$569.99



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## ValuePoint® SpaceSavers

Unleash performance at an entry level price  
 ▲ 4MB RAM exp. to 64MB  
 ▲ VGA Local Bus graphics  
 ▲ 256KB Video RAM exp. to 1MB  
 ▲ Serial, parallel, mouse, and keyboard ports  
 ▲ MS-DOS 6.1/MS Windows 3.1, mouse,  
 and integrated 101 keyboard

Model	Hard Drive	Price*
2255PT	120MB	\$889**
2255	120MB	\$929
2253	212MB	\$1399
2266	212MB	\$1789

\*model includes 1.1 enhanced keyboard



## ValuePoint® SpaceSaver

## ValuePoint® Desktops

Maximum expandability in a desktop

- ▲ 4MB RAM exp. to 64MB
- ▲ Pentium upgradable
- ▲ VESA Local Bus graphics (w/open VESA slot)
- ▲ 1MB Video RAM exp. to 2MB
- ▲ 5 expansion slots, 5 drive bays
- ▲ IBM DOS 6.1, MS Windows 3.1, mouse

Processor	Hard Drive	Price*
486SX/33	170MB	\$1359
486DX/33	212MB	\$1559
486DX/33	340MB	\$1719
486DX2/66	340MB	\$2159

Minitower models also available

## ValuePoint® Multimedia

Multimedia. Ready to run.

▲ Based upon the ValuePoint® Desktop models

### Multimedia Components Include:

- ▲ SoundBlaster 16 stereo sound card
- ▲ IBM internal double speed CD-ROM drive
- ▲ Creative Labs speakers & microphone
- ▲ 10 CD-ROM software titles

Processor	Hard Drive	Price*
486DX/33	212MB	\$2099
486DX2/66	340MB	\$2699

## ValuePoint® P60/D Pentium

The ultimate power trip

- ▲ 16MB RAM exp. to 128MB
- ▲ 256KB cache standard
- ▲ 4 expansion slots (2 PCI, 1 PCI/A, 1 AT)
- ▲ 5 drive bays

Processor	Hard Drive	Price*
Pentium 60MHz	424MB	\$3099
Pentium 60MHz	525MB	\$4099

\*monitor priced separately

## ThinkPad® 500 subnotebook

Lighten your load, and increase your power.

- ▲ IBM 486SLC2/50 processor
- ▲ 4MB RAM exp. to 12MB
- ▲ 170MB hard drive
- ▲ 7.4" VGA monochrome display
- ▲ 1 Type II PCMCIA slot
- ▲ TrackPoint II integrated pointing device

**\$1939**



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# Toshiba Direct



## ValuePoint® T3400

- ▲ Ultra-portability at only 4.1lbs
- ▲ 486SX/33 processor
- ▲ 20MB hard drive
- ▲ 4MB RAM, expandable to 20MB
- ▲ PCMCIA Type II slot
- ▲ External 3.5" disk drive
- ▲ Integrated AccuPoint pointing device

Model	Price
T3400	\$2259
T3400	\$3469

Lease for \$82/mo.

## T4700



## T4700/T4800

- ▲ 8MB RAM, expandable to 24MB
- ▲ Brilliant 9.5" display with local bus video
- ▲ 2 PCMCIA slots (Type II, Type III)
- ▲ Microsoft Sound System, built-in microphone, audio out port
- ▲ MS-DOS, UltraFont, Indeo video compression software, Windows 3.1 (T4700)/Windows for Workgroups 3.11 (T4800)

Model	Processor	Screen	Hard Drive	Price
T4700	486DX2/50	Dual scan color	200MB	\$3999
T4700	486DX2/50	Dual scan color	320MB	\$4329
T4700	486DX2/50	Active color	200MB	\$4599
T4700	486DX2/50	Active color	320MB	\$4949
T4800	486DX4/75	Active color	500MB	\$5619

Lease for \$147/mo

## ValuePoint® T400CT



## T1910/1950

- ▲ 4MB RAM, expandable to 20MB
- ▲ 9.5" display
- ▲ Type III PCMCIA slot
- ▲ 82-key keyboard
- ▲ MS-DOS, Windows 3.1
- ▲ Ballpoint mouse with Quickport
- ▲ Enhanced power management

Model	Processor	Screen	Hard Drive	Price
T1910	486SX/33	Monochrome	120MB	\$1499
T1910	486SX/33	Dual scan color	120MB	\$2099
T1910	486SX/33	Dual scan color	200MB	\$2329
T1950	486DX2/40	Monochrome	200MB	\$2099
T1950	486DX2/40	Dual scan color	200MB	\$2719
T1950	486DX2/40	Active color	200MB	\$3069
T1950	486DX2/40	Active color	320MB	\$3399

Lease for \$55/mo

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# VTECH Makes Buying Direct Easy...

## 486DX2/66 Multi-Media Hardware Feature Comparison

Feature	VTECH	DELL	Gateway	ZEOS
Memory	8MB	8MB	8MB	8MB
Hard Drive	426MB	450MB	424MB	426MB
Floppy Drives	3.5*	3.5*	3.5*	3.5"
Video	1MB VLB	1MB VLB	1MB VLB	1MB VLB
3 Year Warranty	Yes	No	No	No
Double Speed CD-ROM	Yes	Yes	Yes	Yes
Sound Card & Speakers	Yes	Yes	Optional (\$132)	Optional (\$148)
Modem	Yes	Optional (\$79)	Optional (\$49)	Optional (\$49)
Remote Diagnostics Sftw.	Yes	No	No	No
Case	Full Size	Desktop	Baby AT	Desktop
External Cache	128K	128K	128K	No
Monitor	15"	15"	15"	Upgrade (\$95)
PC Computing Service	**	**	**	**
Value Rating (Aug 1993)	***	**	**	**
Price	\$2199	\$3074	\$2476	\$2762

The VTECH Multi-Media systems are available with VTECH's integrated local bus or with our new VESA local bus. Each system also includes Compton's Interactive Encyclopedia, Webster's Dictionary and World Atlas which will turn your computer into a complete information center for the whole family.

In 1993 Computer Shopper singled out VTECH as one of the fastest growing companies in the PC industry. The reason is simple, we are the manufacturer - not an assembler of someone else's components - which means we can truly deliver "Technology at Prices You Can Afford."

- VTECH designs and manufactures our own components so we control the quality, features and performance.
- With over 11,000 employees and 3 research and engineering labs VTECH has the technology and resources to build incredible systems.
- Our prices are among the lowest in the industry because we supply systems to some of the largest manufacturers in the world and that helps us keep production high and prices low.
- 3 year warranty - PC Computing gave VTECH a 5 Star Service Value Rating beating out Dell, Gateway, ZEOS, IBM and Compaq.

**3 YEAR  
WARRANTY**



## ...Multi-Media Systems You Can See and Hear

### Expo 486SX33M

- Pentium Technology Ready
- 4MB RAM
- 250MB 13ms IDE Hard Drive
- Double Speed CD-ROM
- Stereo Sound Board
- Compton's Interactive Encyclopedia, Webster's Dictionary and World Atlas
- Local Bus Graphics with 1MB
- 3.5" Diskette Drive
- 14" VTECH HiRez Monitor
- Full Size Metal Desktop Case
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$1449**  
**\$1399 with 486SX25**

### Expo 486DX33VM

- Intel Verified: for the Pentium™ OverDrive™ Processor
- 4MB RAM with 128KB Cache
- 340MB 13ms IDE Hard Drive
- Double Speed CD-ROM
- Stereo Sound Board
- Compton's Interactive Encyclopedia, Webster's Dictionary and World Atlas
- VLB Graphics with 1MB
- 3.5" Diskette Drive
- 15" VTECH HiRez Monitor
- Full Size Metal Desktop Case
- Dual Cooling Fans
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$1799**  
**\$1899 with 486DX2/50**

### Expo 486DX2/50VM

- Intel Verified: for the Pentium™ OverDrive™ Processor
- 8MB RAM with 128KB Cache
- 424MB 13ms IDE Hard Drive
- Double Speed CD-ROM
- Stereo Sound Board
- Compton's Interactive Encyclopedia, Webster's Dictionary and World Atlas
- VLB Graphics with 1MB
- 3.5" Diskette Drive
- 15" VTECH HiRez Monitor
- Full Size Metal Desktop Case
- Dual Cooling Fans
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$1999**  
**\$2199 with 486DX2/66**

### Expo 486DX2/66VM

- Intel Verified: for the Pentium™ OverDrive™ Processor
- 16MB RAM with 128KB Cache
- 527MB 12ms IDE Hard Drive
- Double Speed CD-ROM
- Stereo Sound Board
- Compton's Interactive Encyclopedia, Webster's Dictionary and World Atlas
- VLB Graphics with 1MB
- 3.5" Diskette Drive
- 15" VTECH HiRez Monitor
- Full Size Metal Desktop Case
- Dual Cooling Fans
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

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# Hot New VESA Systems...



The Expo 486 VESA System with Multi-Media upgrade

The VTech VESA systems are loaded with the extra features. Dual Cooling Fans keep the processor, system board, and option cards cool. This means if you upgrade to the Pentium OverDrive Processor it will be safe and reliable. In fact, these systems have been Intel Verified: for the Pentium™ OverDrive™ Processor.

The VTech VESA systems have been specially optimized to deliver the speed and graphics performance that today's Windows applications demand. Each system is equipped with two VESA slots and extra attention has been placed on system compatibility with a wide range of VESA cards. These systems deliver great Windows performance and the extra features you want, at prices you can afford.

The ExpoTech family of VESA systems is available with a wide range of processors, hard drives and memory combinations. All VTech systems are covered by a 3 year warranty and include the extra features and support VTech is known for.

- 2 VLB Slots
- Novell Certified
- Advanced case design with dual cooling fans
- 30 day money back guarantee



...Prices You Can't Beat

## Expo 486SX33V

- Intel Verified: for the Pentium™ OverDrive™ Processor
- 4MB RAM
- 250MB 14ms IDE Hard Drive
- VLB Graphics with 1MB
- 3.5" Diskette Drive
- 14" VTech HiRez Monitor
- Full Size Metal Desktop Case
- Dual Cooling Fans
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

\$1199  
\$1399 with 486DX33

## Expo 486DX33V

- Intel Verified: for the Pentium™ OverDrive™ Processor
- 4MB RAM with 128KB Cache
- 340MB 13ms IDE Hard Drive
- VLB Graphics with 1MB
- 3.5" Diskette Drive
- 14" VTech HiRez Monitor
- Full Size Metal Desktop Case
- Dual Cooling Fans
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

\$1549  
\$1599 with 486DX2/50

## Expo 486DX2/50V

- Intel Verified: for the Pentium™ OverDrive™ Processor
- 8MB RAM with 128KB Cache
- 424MB 13ms IDE Hard Drive
- VLB Graphics with 1MB
- 3.5" Diskette Drive
- 15" VTech HiRez Monitor
- Full Size Metal Desktop Case
- Dual Cooling Fans
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

\$1749  
\$1949 with 486DX2/66

## Expo 486DX2/66V

- Intel Verified: for the Pentium™ OverDrive™ Processor
- 16MB RAM with 128KB Cache
- 527MB 12ms IDE Hard Drive
- VLB Graphics with 1MB
- 3.5" Diskette Drive
- 15" VTech HiRez Monitor
- Full Size Metal Desktop Case
- Dual Cooling Fans
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

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Circle 195 on reader service card.



# VTech Power Systems...

**V**Tech is the first and only company to bring Symmetrical Multiprocessing to the desktop at prices that blow away even single processor systems. Just look what the experts are saying.

- "The overall performance of the VTech gave it the highest rating of any of the 486 systems, and the jaw dropping price is outstanding."  
Computer Shopper, February 1994
- "The awesome VTech Platinum beats the Pentium and costs a cool \$3,995 [Now Even Lower!]"  
Computer Shopper, February 1994
- "Multiprocessing is clearly the wave of the future."  
PC Week, August 23, 1993
- "VTech leads in PC Multiprocessing."  
PC Magazine, October 12, 1993



The VTech Platinum SMP with CD-ROM

**V**Tech is the first and only company to bring Symmetrical Multiprocessing to the desktop at prices that compete with single processor systems. VTech provides you with three upgrade paths. From the single processor Platinum 486 you can upgrade to dual 486 processors, a single Pentium™ Overdrive™ Processor, or for the ultimate in power and performance, dual Pentium™ Overdrive™ Processors.

**P**entium systems are the next frontier of PC performance. If you have a need for speed the VTech Pentium systems will deliver. Utilizing the PCI bus the VTech systems deliver high power at breakthrough pricing.



## Platinum 486DX2/50

- Intel 486DX2/50 Processor
- Intel Verified: for the Pentium™ OverDrive™ Processor
- 8MB RAM
- 424MB 13ms IDE Hard Drive
- 256KB Copy Back Cache w/Cast Out Buffering
- SCSI II w/ built-in BIOS support
- 16550 Serial Port Controllers
- Multiprocessor Upgrade Slot
- S3 VLB Accelerator with 1MB
- 3.5" Diskette Drive
- 15" VTech HiRez Monitor
- Full Size Metal Desktop Case
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$1999**  
**\$2299 with 486DX2/66**

## Platinum 486DX2/66

- Intel 486DX2/66 Processor
- Intel Verified: for the Pentium™ OverDrive™ Processor
- 16MB RAM
- 424MB 13ms IDE Hard Drive
- Double Speed CD-ROM
- 256KB Copy Back Cache w/Cast Out Buffering
- SCSI II w/ built-in BIOS support
- 16550 Serial Port Controllers
- Multiprocessor Upgrade Slot
- S3 VLB Accelerator with 1MB
- 3.5" Diskette Drive
- 15" VTech HiRez Monitor
- Full Size Metal Desktop Case
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$2799**

## Platinum 486DX2/66\*

- Dual Intel 486DX2/66 Processors
- Intel Verified: for the Pentium™ OverDrive™ Processor
- 16MB RAM
- 527MB 12ms IDE Hard Drive
- Double Speed CD-ROM
- 256KB Copy Back Cache w/Cast Out Buffering
- SCSI II w/ built-in BIOS support
- 16550 Serial Port Controllers
- S3 VLB Accelerator with 1MB
- 3.5" Diskette Drive
- 15" VTech HiRez Monitor
- Full Size Metal Desktop Case
- Windows NT
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$3799**

## Platinum P5-60

- Intel 60MHz Pentium™ CPU
- 8MB RAM with 256k Cache
- 424MB 13ms IDE Hard Drive
- PCI Local Bus Graphics with 1MB
- 3.5" Diskette Drive
- Enhanced Parallel Port
- High Speed Serial Port Controller
- 15" VTech HiRez Monitor
- Full size Metal Desktop Case
- Double Speed CD-ROM
- MS-DOS 6.2 & Windows 3.1
- Quality Keyboard, Mouse
- 3 Year Warranty
- Next generation P5 Pentium Overdrive Processor Ready
- Dual Cooling Fans
- Self Sensing setup for HD and mem

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**\$3299 with 16MB and 527MB**

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# VTech Value Systems...

The Expo 486 Integrated System

The ExpoTech series of integrated systems from VTech have been our most popular systems. Their great combination of performance, features, and low price have made them the clear choice for anyone looking for great value.

Integrated means we've combined as many features and performance enhancements as possible into the main system board. This integration creates a well designed board with exceptional reliability and performance.



**BEST  
BUY**

## Expo 486SX33

- Pentium Technology Ready
- 4MB RAM
- 210MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- 3.5" and 5.25" Diskette Drive
- 14" VTech HiRez Monitor
- Full Size Metal Desktop Case
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$1149**  
**\$1133 with 486SX25**

## Expo 486DX33

- Pentium Technology Ready
- 4MB RAM with 128KB Cache
- 340MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- 3.5" and 5.25" Diskette Drive
- 14" VTech HiRez Monitor
- Full Size Metal Desktop Case
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$1499**  
**\$1549 with 486DX2/50**

## Expo 486DX2/50

- Pentium Technology Ready
- 4MB RAM with 128KB Cache
- 424MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- 3.5" and 5.25" Diskette Drive
- 14" VTech HiRez Monitor
- Full Size Metal Desktop Case
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$1599**

## Expo 486DX2/66

- Pentium Technology Ready
- 8MB RAM with 128KB Cache
- 424MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- 3.5" and 5.25" Diskette Drive
- 15" VTech HiRez Monitor
- Full Size Metal Desktop Case
- 9600/2400 Data/Fax Modem
- Remote Diagnostics Software
- MS-DOS 6.2 & Windows 3.1
- Enhanced 101 - Keyboard & Mouse
- 3 Year Warranty

**\$1899**

## ...Power Portables

### ExpoNote 486SLC/33

- 4MB RAM, 120MB Hard Drive
- Removable Hard Drive
- 640x480 VGA with 64 grey levels
- Semiarbitrary External VGA port
- 3.5 Diskette Drive
- 9600/2400 Data/Fax Modem
- MS-DOS 6.0 & Windows 3.1
- Only 2.1"(H) x 11.4"(W) x 2.25"(D)
- Power management functions
- Full Size Mouse

**\$1299**  
**\$999 with 386SX/33**  
Modem not included in 386SX/33



The ExpoTech Notebooks offer a great combination of features and price. The removable hard drive provides versatility usually found only on systems costing hundreds more.

- Portable - Weighs less than 7lbs.
- Powerful - 4MB RAM and 120MB HD
- 9600/2400 Data/Fax modem
- 1 Year Warranty on Notebooks

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During the first year of your warranty, we replace: not repair, any defective items. All items receive lifetime technical support from our factory trained techs.

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Anyone can sell you a hard drive. We sell easy to install storage solutions. We spend countless hours researching the best solutions, then create our quick response installation guides for each kit.

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## Maxtor

The MX1540A is the fastest 540MB IDE drive! It features a 8.5ms average access time, 6300rpm spindle speed, and a 256K buffer. This is a 3.5" low profile drive with a 1 year warranty.



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\$239 SCSI103S SCSI Drive Bare \$279  
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IDE drive accelerators increase the data transfer rate of your IDE drive 30 to 80%. Works by enabling the drives Read Multiple & Write Multiple commands to greatly increase performance. We highly recommend these products for WD, Conner, Quantum, Seagate, Micropolis, Maxtor, & Fujitsu. Also w/drive

GS1-21 Board supports 2 IDE drives. 4 floppy drives. Includes QIC-80 tape drive, speed \$65 \$85  
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GS1-32 Board same as 21 adds 2 16550 serial ports & 1 bi-directional parallel port \$139 \$119  
GS1 MaxIDE Software solution on existing IDE configuration (requires less than 1K of memory). Includes performance benchmark test. \$34 \$25

### ALPHA RESEARCH

Disk caching controllers give your hard drives an effective disk seek time of less than .3ms. Each board is expandable up to 16MB of cache with standard SIMM memory. (Price listed with no memory. Call for quote on populated boards.) All boards also have floppy support (except PCI).  
IDE SCSI \$10 (does not work with hard drive purchase!)  
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### HARD DRIVES

## CONNER

IDE				
210MB	14ms	CPS210A	\$209	
420MB	13ms	CPA340A	\$279	
420MB	13ms	CPA420A	\$325	
541MB	12ms	CPA540A SCALL		

### digital

SCSI				
1600MB	9.7ms	DSP3160	\$1199	
210MB	9.7ms	DSP3210	\$1859	
420MB	11ms	DSP3530	\$2399	
4000MB	11ms	DSP5400	\$2599	

### FUJITSU

IDE				
520MB	9ms	M2624T	\$529	
SCSI				
1080MB	9ms	M2694ESA	\$799	
2060MB	12ms	M2694ESA	\$1499	

## Maxtor

IDE				
245MB	15ms	7245A	\$249	
345MB	14ms	7345A	\$278	
540MB	12ms	7546A	\$459	
840MB	8.5ms	MKT540A	\$459	
340MB	14ms	7345S	\$349	

## MICROPOLIS

IDE				
1050MB	10ms	MC2210A	\$815	
1740MB	10ms	MC2217A	\$1099	
SCSI				
1050MB	10ms	MC2210	\$815	
1052MB	8.5ms	MC4110	\$815	
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### HARD DRIVES

## Quantum

IDE				
170MB	14ms	LPS170A	\$199	
270MB	12ms	LPS270A	\$229	
342MB	12ms	LPS340A	\$269	
541MB	12ms	LPS540A	\$425	
SCSI				
170MB	14ms	LPS170S	\$245	
270MB	12ms	LPS270S	\$285	
342MB	12ms	LPS340S	\$299	
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1800MB	10ms	PD1800S	\$999	

### Seagate

IDE				
210MB	16ms	ST1243A	\$209	
260MB	16ms	ST1290A	\$229	
345MB	12ms	ST1390A	\$269	
482MB	12ms	ST1350A	\$340	
SCSI				
1690MB	8ms	ST11950N	\$1469	
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### WESTERN DIGITAL

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341MB	12ms	AC2340	\$278	
425MB	12ms	AC2420	\$309	
540MB	11ms	AC2540	\$429	
Boost WD performance with MaxIDE S2!				

### CONTROLLER CARDS

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A1522B ASIC 16bit SCSI	\$129	\$109
A1542C ASIC 16bit SCSI	\$235	\$215
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A2842 VESA SCSI	\$319	\$299
T130 8bit SCSI	\$79	\$65
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FUTURE DOMAIN		
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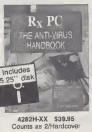
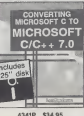
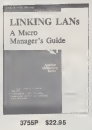
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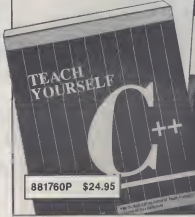


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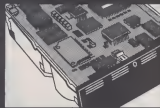
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## FAST, EASY INSTALLATION

Anyone can sell you a hard drive. We sell easy to install storage solutions. We spend countless hours researching the best solutions, then create our quick precise installation guides for each kit.

MONTHLY SPECIALS

# Maxtor

The MXT540A is the fastest 540MB IDE drive made! It features a 8.5ms average access time, 6300rpm spindle speed, and a 256K buffer. This is a 3.5" low profile drive with a 1 year warranty.

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Now available 270MB!

SQ310SA IDE Drive Bare with GSI-18 & 1 disk  
Portable external, attaches to printer port with 1 cartridge

108MB Removable Media Drive. The #1 storage solution for the 1990's. Hard drive speed (14.5ms). Low cost per MB. Mounts in 3 1/2" or 5 1/4" bay. Great for unlimited upgradability, data archival, transport & exchange, just to name a few.

\$239	SQ310SS SCSI Drive Bare	\$279
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\$329	with Adaptec 1542 & 1 disk	\$529
\$399	External for Macintosh & 1 Disk	\$599

GSI

GSI drive accelerators increase the data transfer rate of your IDE drive 30 to 80%. Works by enabling the drives Read Multiple & Write Multiple commands to greatly increase performance. We highly recommend these products for WD, Conner, Quantum, Seagate, Micropolis, Maxtor, & Fujitsu. Alone w/Drive GSI-21 Board supports 2 IDE, 4 floppy drives. Doubles QIC-80 tape drive speed. \$65 \$85 GSI-18 Board same as 2 IDE drives. Works in conjunction with MFM, RLL, etc. \$55 \$45 GSI-32 Board same as 2 IDE drives. Works in conjunction with MFM, RLL, etc. \$139 \$119 GSI MacIDEA Software solution works on existing IDE configuration (requires less than 1K of memory). Includes performance benchmark test. \$34 \$25

## ALPHA RESEARCH

Disk caching controllers give your hard drives an effective disk seek time of less than .3ms. Each board is expandable up to 16MB of cache with standard SIMM memory. (Price listed is with no memory. Call for quote on populated boards.) All boards also have floppy support (except PCI).

IDE	SCSI	\$10 Discount with any hard drive purchase!
ISA (\$425)	ISA (\$425S)	\$229
VESA Local Bus (\$475)	VESA Local Bus (\$475S)	\$369
PCI (\$485)	EISA (\$455S)	\$409

## HARD DRIVES

# CONNER

IDE	14ms	CFS210A	\$209
340MB	13ms	CFA340A	\$279
420MB	14ms	CFA420A	\$279

## HARD DRIVES

# Quantum

IDE	14ms	1PS170A	\$199
270MB	12ms	1PS270A	\$229

## HARD DISK CARDS

Drive & controller on card. Saves drive bay. Compatible with XT, AT, Tandy, and others.

170MB	\$269	240MB	\$339
340MB	\$439	\$25MB	\$779

## TAPE DRIVES

# CONNER

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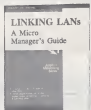
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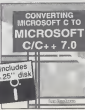
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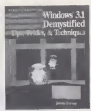
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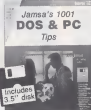
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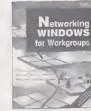
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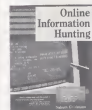
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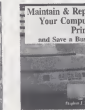
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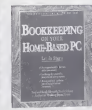
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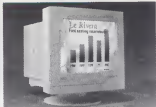
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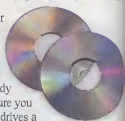
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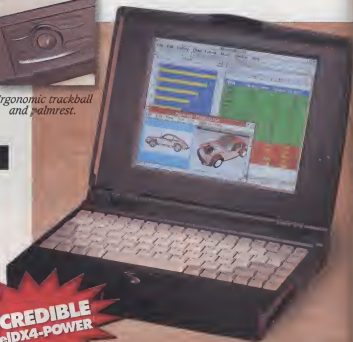
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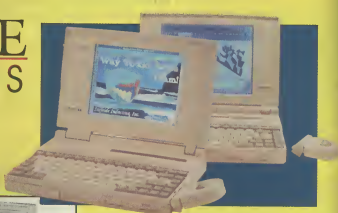




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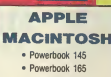
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This card includes all the ProAudio Spectrum 16 features. In addition, it also has a 20MIPS DSP (digital signal processor), built-in General MIDI, and Roland MT-32 MIDI to support the 2MB on board Wavetable (which contains over 200 recorded instruments for true-to-life sounds).  
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- Microsoft DOS 6.2
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## NP3600 FEATURES

- Intel Pentium™ 64-bit performance
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- 32-bit Local Bus IDE, improved data transfer rate of up to 45%
- 1 PCMCIA Type III & 1 PCMCIA Type II Slots
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- 2-Hour Quick Charge

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- 3.5" 1.44MB Floppy Drive
- 64 640x480 Video Display 256 Colors or 16 Gray Shades (1024x768 5.0 MBs Video Display CRT & LCD Operation)
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- 86-Key Keyboard
- Microsoft DOS 6.2
- Carrying Bag & AC/Adapter
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- VESA Local Bus Power when used with Optional Docking Station
- Sager's Umbrella Protection Policy



## 486 NP700 CONFIGURATIONS

- Intel 486 CPU
- 4MB RAM expandable to 16MB
- Removable 120MB Hard Drive (250, 340, 520MB Optional)
- 3.5" 1.44MB Floppy Drive
- 10" Mono LCD VESA 640x480, 64 Grays
- 10" Dual Scan Color LCD VESA 640x480, 256 Colors
- Large Built-In 16mm Trackball
- PCMCIA Type I & II Slot
- Ports for IS, 1P, Ext keyboard/keyboard, VESA monitor & AT/Bus for expansion box
- 85-Key Keyboard
- Nickel Metal-Hydrine battery
- Microsoft DOS 6.2
- Carrying Bag & AC/Adapter
- Weight 5.5lbs with Battery
- 11.4" W x 8.6" D x 1.65"H
- Sonnet's Umbrella Protection Policy

## NP700 FEATURES

- Module Pack Area: (Optional)  
Fax/Modem, PS/2 Mouse+COM 2
- PCMCIA Slot
- Intel 486 Upgradeable CPU  
(486SX+486DX+486DX2)
- 180° LCD Display Angle Rotation
- 2-Hour Quick Charge
- NiMH Battery No memory effect,  
Longer Battery Life
- External Battery Pack: (Optional)  
Doubles Running Hours Screws Into  
Bottom Back of Notebook Raising &  
Angling Keyboard for Easy Typing

## NP700 OPTIONS

FAX/Modem Module  
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Starting At:

**\$1249\***

\* System prices include 14" FLEXVISION SVGA, 28cm dot pitch, 1024x768 M Monitor

## All PS/ValuePoint Systems Feature

- Intel Microprocessors
- 4MB RAM (Exp. to 64MB)
- VESA Local Bus SVGA
- Video: 640x480, 800x600, 1024x768, 1280x1024
- 6 Floppy Diskette
- Disk Storage Bin
- 6 Outer Storage Protector
- 1 Piece Tool Kit
- Mouse Pad
- 2 serial, 1 parallel, keyboard, mouse
- IBM DOS, MS Windows 3.1
- 1 Year Onsite Warranty
- Around-the-clock IBM HelpWare® Support
- Basic 101-key keyboard

## IBM PS/ValuePoint System Specifications

Model Speed Hard Drive Price\*

## PS/ValuePoint Si - SpaceSaver

486SX	25 MHz	120 MB	\$149
486SX	25 MHz	212 MB	\$249
486DX	33 MHz	120 MB	\$149
486DX	33 MHz	212 MB	\$169
486DX2	66 MHz	212 MB	\$199

## PS/ValuePoint Desktop

(Includes 32-Bit VLB Slot, IFF socket, and is Pentium™ Overdrive Upgradeable)

486SX	33 MHz	170 MB	\$159
486DX	33 MHz	212 MB	\$179
486DX	33 MHz	340 MB	\$199
486DX2	66 MHz	340 MB	\$239

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Please answer questions below:

1. Where do you use your computer? (Check one only)

A ☐ Home B ☐ Business C ☐ Both

2. What kinds of computers do you use? (Check all that apply)

D ☐ IBM/Compatible Laptop E ☐ IBM/Compatible Desktop F ☐ MAC

3. Do you plan to buy any of the hardware or software mentioned below in the next three months? (Check all that apply)

#### HARDWARE

G ☐ PC  
H ☐ MAC  
I ☐ Laptop  
J ☐ Printer  
K ☐ Monitor  
L ☐ Desktop Back-up  
M ☐ Add-in Board  
N ☐ Modem  
O ☐ Input Device  
P ☐ Local Area Network

#### SOFTWARE

Q ☐ Accounting  
R ☐ Spreadsheet  
S ☐ Personal Finance  
T ☐ Desktop Publishing  
U ☐ Word Processor  
V ☐ Database Manager  
W ☐ Graphics  
X ☐ Utility

Y ☐ Communications  
Z ☐ Windows/Multi-tasking  
1 ☐ Programming Language/Compiler  
2 ☐ Integrated/Multifunction  
3 ☐ CAD

4. From which of the following sources do you purchase personal computer products? (Check all that apply)

4 ☐ Specialty Computer Retail Stores  
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3. Do you plan to buy any of the hardware or software mentioned below in the next three months? (Check all that apply):

## HARDWARE

- G. ☐ PC  
H. ☐ MAC  
I. ☐ Laptop  
J. ☐ Printer  
K. ☐ Monitor  
L. ☐ Disk/Tape Backup  
M. ☐ Add-in Board  
N. ☐ Modem  
O. ☐ Input Device  
P. ☐ Local Area Network

## SOFTWARE

- Q. ☐ Accounting  
R. ☐ Spreadsheet  
S. ☐ Personal Finance  
T. ☐ Desktop Publishing  
U. ☐ Word Processor  
V. ☐ Database Manager  
W. ☐ Graphics  
X. ☐ Utility  
Y. ☐ Communications  
Z. ☐ Windows/Multi-tasking  
1. ☐ Programming Language/Compiler  
2. ☐ Integrated/Multi-function  
3. ☐ CAD

4. From which of the following sources do you purchase personal computer products? (Check all that apply):

4. ☐ Specialty Computer Retail Stores 6. ☐ Direct from Manufacturers  
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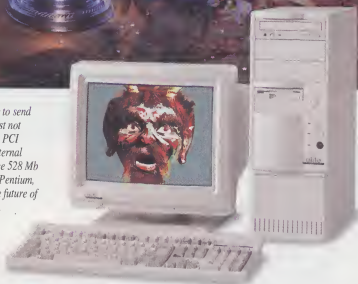
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Weighing only 3.9 pounds, the Elite 486SX-25 SubNote delivers spell-binding computer power in a space-saving design. You'll find Intel's "SL Enhanced" 486SX-25 processor (designed especially for portable computers) inside, as well as 4 Mb of RAM and up to a 520 Mb hard drive. And with the SubNote's captivating 10" high-contrast screen and up to five hours of battery life, you'll never feel like you're sacrificing desktop quality for lightweight portability.

Presto! For a notebook you can see and hear try our color DX4 SoundBook. This notebook highlights the latest Intel clock-tripler chip for 75 MHz processing speeds and integrated audio features. You get a built-in microphone, a speaker and external jacks for sounds never before heard from a 6.9 pound notebook computer. Bundled audio accessory software for Windows and DOS environments lets you record, compress, store and playback voices, sounds or music. You'll also get local bus

accelerated video and 1 Mb video DRAM for true 24-bit color graphics on a whopping 10.3" dual-scan color screen.

Trying to steal the spotlight, our 486SX/DX Notebooks come with a large 9.5" monochrome, 10.3" dual-screen color or 9.5" active-matrix color screen and an upgradeable Intel processor. A PCMCIA Type III slot lets you add network adapters, modems and interchangeable hard drives.

## Long On Battery Life, Short On Weight

All Elite 486SX/DX Notebooks and SubNotes operate on Intel's "SL-Enhanced" microprocessor. Known for low power consumption, the processor also delivers excellent power management for longer battery life.

## A Hard Act To Follow

As you'll soon learn, the only tricks we have up our sleeves are the best products at the best prices in the computer industry. The proof lies in our 14 Computer Shopper Best Buy Awards chosen by Shopper readers and PC Computing's prestigious Five Star Rating for top-hat service and price performance.

## ELITE NOTEBOOKS

### ELITE SoundBook

- Intel 486, DX2 or DX4 Processor
- 4 Mb RAM (expands to 20 Mb)
- 9.5" Mono, 10.3" Dual-Scan, or 9.5" Active Matrix VGA Display
- Local Bus Video with 1 Mb Video DRAM
- Business Audio Features Including: Built-in Microphone & Speaker External Jacks for Line In & Line Out
- 3.5" Built-in Diskette Drive
- User Replaceable Hard Drive
- Two Type II/One Type III PCMCIA Slot
- Built-in Trackball
- NiMH Battery & AC Adapter
- Advanced Power Management with SMI
- One Parallel and One Serial Port
- External VGA and Keyboard Port
- MS DOS 6.2 & WFW 3.11
- Lotus Organizer
- Weight: Mono - 6.2 lbs. Color - 6.7 lbs.
- Carrying Case

### Monochrome SoundBook

- 486SX-33 with 260 Mb HDD  
#007334 **\$1499**
- 486DX-33 with 260 Mb HDD  
#007335 **\$1699**
- DX2-50 WITH 340 MB HDD  
#007336 **\$1799**

### Dual Scan Color SoundBook

- 486SX-33 with 260 Mb HDD  
#007328 **\$1999**
- 486DX-33 with 260 Mb HDD  
#007329 **\$2199**
- DX2-50 with 340 Mb HDD  
#007330 **\$2299**
- DX2-66 with 520 Mb HDD  
#007331 **\$2499**
- DX4-75 with 340 Mb HDD & 8 Mb of RAM  
#007332 **\$2799**
- DX4-100 with 520 Mb HDD & 8 Mb of RAM  
#007333 **\$2999**

### Active Matrix Color SoundBook

- DX2-66 with 340 Mb HDD & 8 Mb of RAM  
#007337 **\$3499**
- DX4-75 with 520 Mb HDD & 8 Mb of RAM  
#007338 **\$3799**
- DX4-100 with 520 Mb HDD, 8 Mb of RAM & PCMCIA 9624 S/R Fax Modem  
#007339 **\$3999**

### Elite 486SX SubNote

- Intel 486SX SL-Enhanced Processor
- 4 Mb RAM (expands to 12 Mb)
- 9.5" Mono or Dual Scan VGA Display
- Turbo Bus Accelerated Video
- 3.5" External Diskette Drive
- User Replaceable Hard Drive
- One Type II PCMCIA Slot
- Built-in Trackball
- NiMH Battery and AC Adapter
- Advanced Power Management with SMM
- One Parallel and One Serial Port
- External VGA and Keyboard Port
- MS DOS 6.2
- Weight: 3.9 lbs.
- Carrying Case

### Monochrome SubNote

- 486SX-25 with 260 Mb HDD  
#007342 **\$1299**
- 486DX-25 with 340 Mb HDD PCMCIA 9624 S/R Fax Modem  
#007307 **\$1499**

### Dual Scan Color SubNote

- 486SX-33 with 260 Mb HDD WFW 3.11  
#007340 **\$1899**
- 486SX-33 with 340 Mb HDD WFW 3.11  
#007341 **\$1999**

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### Monochrome

**\$1299**

486SLC-33, 4MB RAM/  
120MB HDD

### Dual Scan Color

**\$1999**

486SX-33, 4MB RAM/  
120MB HDD

### 486SLC-33

- 486SLC-33MHz
- Internal Cache
- 4MB RAM
- 120MB Hard Disk Drive
- 3.5" 1.44MB Floppy Drive
- Backlit 10" VGA 640 X 480
- Simultaneous Display
- Printer Port, Serial Port, VGA Port
- PS/2 Keyboard Port
- 85-Key Inverted "T" Keyboard
- Dual Battery Packs (Quick Charge)
- Battery Life 6Hr. with Power Management
- 100-240V Power Adapter
- Advanced Power Management Features
- MS-DOS 6.2 Installed
- Weighs 6.2 Pounds
- Measures 8.6 X 11.7 X 1.95 Inches

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Modem

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Mouse

Carrying  
Case

MS-DOS 6.2

**18**

Years  
Warranty

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Canada: 416-405-0711, Outside USA: 510-490-4300, ext.768



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To ship**

	10" Mono		Dual Scan Color
	120MB	200MB	120MB
486SLC-33	\$1299	\$1399	-
486SLC2-50	\$1349	\$1449	-
486SX-33	\$1399	\$1499	\$1999
486DX-33	\$1749	\$1849	\$2249
486DX2-50	\$1899	\$1999	\$2399
486DX2-66	-	\$2199	\$2599

Major credit cards accepted. 30 day money back guarantee. One year warranty. Life time full support. Prices and specifications are subject to change without notice. Bondwell Industrial Co. Inc. USA, 47485 Seabridge Drive, Fremont, CA 94538

ENR4DA

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100%  
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EPSON SUN MAGNVOX NEC SHARP CANON ACER QMS

**9 \$48**

**4 x 9 \$168**  
**70 NS SIMMS**

70 NS[illegible]

## Quantum

## DYNAMIC RAMS

1540 X 1-1000	00.00
1540 X 1-4000	0.00
1540 X 1-7000	0.00
1540 X 1-8000	0.75
2540 X 1-15000	3.00
2540 X 1-12000	3.00
2540 X 1-10000	1.00
2540 X 1-5000	0.75
2540 X 1-7000	3.75
2540 X 1-8000	3.75
2540 X 4-10000	0.00
2540 X 4-8000	0.00
2540 X 4-7000	0.00

CACHE

32 X 4-15	0.00
32 X 4-15	18.00
0 X 0-20	0.00
32 X 4-20	7.00
64 X 4-20	0.00
16 X 4-20	0.00
0 X 0-20	0.00
32 X 4-20	0.00
64 X 4-20	10.00
16 X 4-20	0.00
16 X 4-15	0.00
64 X 1-20	10.00

**MATH CO-PROCESSOR**

[illegible]

## FUIITSU

BOOK 123-60 JAMES CHASE  
BOOK 123-60 JAMES CHASE

8308753-00 20MM-CYTR	15
8308753-40 40MM-CYTR	32
8308753-16 16MM-CYTR	30
8308753-28 28MM-CYTR	30

## MICROPOLIS

83075325 JMWG CYRUS	83
83075326 JMWG CYRUS	83

HWY001	
2187-2244-02	HWY001
4187-2244-02	HWY001
4187-2244-02	HWY001
RT	
3287-01-0044-02	RT
3287-10-0044-02	RT
3287-12-0044-02	RT
3287-36-0044-02	RT
3287-38-0044-02	RT
3287-39-0044-02	RT
3287-40-0044-02	RT
3287-41-0044-02	RT
3287-42-0044-02	RT

**CONNER**

4865X-25 USA 128K

46E0X2-84 15A 26K  
46E0X-33 VESA 254K  
46E0X2-68 VESA 256K  
WFLC  
MINI 46E0X-33 5-ISA, 3-ISA, 2VEL, 255K, 6-30P, ZIF  
MINI 46E0X-50 5-ISA 3-EISA 2-VEL 255K, 6-SOPELZ  
MINI 46E0X2-68 5-ISA, 3-EISA, 2-VEL, 1 MEG, 8-30P, ZIF  
EISA2 46E0X-50 6-EISA 2-EISA 512K, 16-30P ZIF  
SUPER 46E0X2-33 6-EISA 1-VLB 255K, 16-30P ZIF  
SUPER 46E0X2-50 6-EISA 1-VLB 512K, 16-30P ZIF  
SUPER 46E0X2-68 8-EISA 1-VLB 1MEG, 16-30P ZIF

## WESTERN DIGITAL

400 (1x-3) 8-ISA, 3-VEGA, 256K 8-30P ZIP

488DX-050 4-FDS, 3-VLSA, 256K, 21F  
488DX-05 4-PCI, 5-ISA 3-VESA, 256K, 21F  
488DX-05, 6-ISA, 3VESA, 256K, 21F

**MECHRONICS [U.S.A.]**  
MX-30 488DX-33 6-ISA, 2VESA 258K, 4-72P  
MX-30 488DX-33 6-ISA, 2VESA 10E, 4-72P  
JX-30 488DX-05 6-ISA, 2VESA 10E, 4-72P  
EISA-3 488DX-33 6-32, 256K 4-72P

**TOSHIE**

486DX2-66 VESA 64K MULTI I/O  
486DX2-66 FISA/VESA 256K MULTI I/O

**AMI Made in U.S.A.**  
 S-V0Y 480D3-33 7-ISA, 2VESA, 256K, 8-30P IDE  
 S-V0Y 480D32-08 7-ISA 2VESA, 256K, 4-72P, IDE  
 ENT-IV 480D3-33 8-EISA 2-VEESA 256K 16-30P  
 ENT-IV 480D32-08 8-EISA 2 VEESA, 256K 16-30P  
 S-V0Y 480D32-66 5-ISA, 2PCI, 256K, 8-30P SCSI, IDE

digita

INTEL CPUs

300 G  
80GB 1X:75  
80GB 1X:50  
60GB 1X:40  
40GB 1X:25  
20GB 1X:10  
10GB 1X:5  
5GB 1X:2.5  
2.5GB 1X:1.25  
1.25GB 1X:0.625  
0.625GB 1X:0.3125

PS 2 HARD DRIVES

## PS 2 HARD DRIVES

PC	1000MHz, 512MB RAM	1000MHz, 512MB RAM	1000MHz, 512MB RAM
OS	Windows XP	Windows XP	Windows XP
GPU	NVIDIA GeForce 7000	NVIDIA GeForce 7000	NVIDIA GeForce 7000
Display	15" LCD	15" LCD	15" LCD
Keyboard	Standard	Standard	Standard
Mouse	Standard	Standard	Standard
Network	10/100 Ethernet	10/100 Ethernet	10/100 Ethernet
Storage	160GB HDD	160GB HDD	160GB HDD
Power	300W PSU	300W PSU	300W PSU
Case	Mid Tower	Mid Tower	Mid Tower
Peripherals	Speakers, Headset	Speakers, Headset	Speakers, Headset
Software	Office Suite, Browser	Office Suite, Browser	Office Suite, Browser
Warranty	3 Years	3 Years	3 Years
Support	24/7	24/7	24/7
Price	\$1,200	\$1,200	\$1,200


**HEWLETT  
PACKARD**

017449	12W45 3C30	1984
1 258 12W45 3C30	1984	

PEY KIRKING, DE	DE	30-00	
PEYKING, DEBORAH E	Individual controls, time monitoring of cable and hardware	Supervisors	2003.03.03, unknown 21
4566 INAO	DE	617	
4566 INAO	DE	617	20
12766 INAO	DE	617	20
20006 INAO	DE	617	20
BECHTOLD, CHRISTOPHER			
DE			18
DE			18
DE	CONTROLLER supports internal SCI phone, 230 630 telephone for member 50 & 50		
DE	CONTROLLER supports 7 internal or external SCI phone, 21		
DE	Phone & Fax Machine with 7 year warranty both support 2003		

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PC/COMPUTING

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- ◆ 600, 800, or 1200 dpi base resolutions  
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- ◆ Single light source ensures exact color registration
- ◆ 200 steps of brightness and contrast
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- ◆ On-board input/output buffer quickens scan time
- ◆ 30-day money back guarantee and one year warranty

ONLY  
**\$1299**  
PR-0008 0297

Part# EST-3057B

### ENVU100 DTP Scanner Solution

- ◆ Photoshop 2.5 \$ 895
- ◆ Microsoft Publisher \$ 199
- ◆ Kai's Power Tools \$ 199
- ◆ OFOTO Color \$ 295

Total Software Value.....\$ 1588

Envisions 800/1600 dpi scanner  
plus software solution is only \$1299

ONLY  
**\$1699**  
PR-0008 0297

Part# EST-3058B

### ENVU24Pro DTP Scanner Solution

- ◆ Photoshop 2.5 \$ 895
- ◆ Microsoft Publisher \$ 199
- ◆ Kai's Power Tools \$ 199
- ◆ OFOTO Gray/Color \$ 295

Total Software Value.....\$ 1588

Envisions 1200/2400 dpi scanner  
plus software solution is only \$1699



An Image Editing Powerhouse  
Adobe Photoshop™ for Windows image editing software has taken desktop publishing to the high end. Photoshop offers extensive features for creating original art, editing and enhancing scanned images, color separating and importing renderings.  
Retail value: \$895  
Stand alone: Call us!  
Included in DTP solution!



Easy-to-Create Publications  
Microsoft Publisher™ makes page layout a breeze! Assemble photos, illustrations and text onto Publisher's electronic page to create eye-catching newsletters, brochures, flyers, presentations, letters, reports, manuals and more. Includes 35 professionally designed templates to launch your creativity.  
Retail value: \$199  
Stand alone: \$199  
Included in DTP solution!



Get Mind-Blowing Special Effects  
Kai's Power Tools™ new Windows version offers 33 awesome plug-in filters for Photoshop and other programs with play ins. Transform your images with textures, backgrounds, gradients, gleams, halos, metallic tubes and more for a creative explosion! Based on the award-winning Mac version.  
Retail value: \$199  
Stand alone: \$199  
Included in DTP solution!



Quick One-Button Scans  
OFOTO™ new color version for Windows fully automates the color and grayscale adjustment process simply by using the specified printer's requirements. In just one step, you can automatically scan, classify, straighten, crop, sharpen, and determine the best highlight and shadow values for your image. Grayscale OFoto ships with ENVU24Pro Color upgrade sent free in fall '91.  
Retail value: \$295  
Stand alone: \$199  
Included in DTP solution!



Pictured:  
ENVU24Pro  
with optional  
transparency  
adapter lid. Scans  
x-rays, slides, transparencies!  
Trans100: Part# EST-9201 \$499  
Trans24Pro: Part# EST-9202 \$699

Envisions flatbed scanners and bundled software require 386 or higher, Windows 3.1, 4MB RAM, 20MB hard disk space free, ISA slot available for interface card (included). PS/2™ and Apple® Macintosh versions are also available.



# ENVISIONS' SCANNING SOLUTIONS INCREASE YOUR PRODUCTIVITY WITH...

## OFFICE AUTOMATION SOLUTIONS

Retype documents no more! Automate tedious retyping, filing and organizing chores with Envisions' Office Automation scanner solutions.



**Scan, File and Retrieve Does Recollect™** document image management software lets you spend more time using your information and less time looking for it. Electronically capture, store, recall and manage all your documents. Now you can truly have the paperless office! Retail value: \$495 Stand alone: \$595 Included in Office Automation solution!



**Efficiently Fill & Print Forms ScanType™** lets you accomplish any tedious form-filling task quickly, accurately, and efficiently on your computer. Simply scan any form, and fill it directly on screen. Or, open a saved PCF file and effortlessly fill it. Saves time, paper, and looks clean and professional! Retail value: \$129 Stand alone: 999 Included in Office Automation solution!



**Organize Scanned Business Cards Lotus Organizer™** is an on-screen calendar, to-do list, planner, address book, notepad and reminder all rolled into one. Use it to set up meetings with anyone on your LHA or WBA via cc-Mail. Retail value: \$499 Stand alone: Call us! Included in Office Automation solution!



**Scan Business Cards in One Step CardScan™** business card scanning software organizes all your crucial business contacts. One button scanning, auto sort and file, automatically dials the phone number you need! It keeps an image of the card for reference. It's like a terrific assistant! Retail value: \$149 Stand alone: Call us! Included in Office Automation solution!



**Creative Control to Process Images Image Folio™** the internationally acclaimed, award-winning image editing software gives you the power to express creative ideas. Image Folio produces images with full editing capabilities! Retail value: \$249 Stand alone: \$129 Included in Office Automation solution!



**Scan Text, Save Time, Be Smart TextBridge™** by Herx is text scanning at its easiest! It performs with consistent accuracy when recognizing text as small as 6 points. TextBridge has a simple user interface to get you working fast. This is the best OCR for recognizing faded documents! Retail value: 999 Stand alone: 999 Included in Office Automation solution!

"Perfect pictures, stellar software. High fidelity color and a comprehensive bundle of picture-and-text-scanning software."  
—PC Computing, April 1994



Other Scanner Solutions Available starting at Call us 1-800-926-7226

**ONLY \$1499**

Part# EST-3059B

- EN08180 OR Scanner Solution**
- ◆ EN08180 Scanner
  - ◆ Herx TextBridge OCR 2.0
  - ◆ Image Folio

Price..... \$799  
 ◆ 25-page Auto Doc. Feeder \$399  
 ◆ ScanType \$129  
 ◆ CardScan \$149  
 ◆ Lotus Organizer \$149  
 ◆ Recollect \$795  
 Total Value ..... \$2420  
 Envisions 800/1600 dpi scanner plus software OR solution is only \$1499

**ONLY \$1999**

Part# EST-3060B

- EN024Pro OR Scanner Solution**
- ◆ En024Pro Scanner
  - ◆ Herx TextBridge OCR 2.0
  - ◆ Image Folio

Price..... \$1199  
 ◆ 25-Page Auto Doc. Feeder \$399  
 ◆ ScanType \$129  
 ◆ CardScan \$149  
 ◆ Lotus Organizer \$149  
 ◆ Recollect \$795  
 Total Value..... \$2820

Envisions 1200/2400 dpi scanner plus software OR solution is only \$1999

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**ENVISIONS**

Scanner Solutions Made Easy

Page 2 of 3



# ENVISIONS' HANDHELD SCANNERS DEFINE VALUE!



## Envisions' bundles are more logical than Logitech's, by far!

Let's be reasonable - both Envisions and Logitech offer terrific handheld scanners bundled with premium software to scan text and graphics. They both scan full pages using automerger technology. But why does Logitech make you pay so much more? We can't figure it out either. It's not logical!

What's the difference between these scanned photos?

Sure, the Logitech ScanMan™ Color delivers a nice scanned image, but are you prepared to spend an extra \$209 for the Logitech name? When you grab an ENVColor scanner, you get a complete scanning solution for text and graphics, all for hundreds less than Logitech!



Photo scanned with ENVISIONS' \$299 ENVColor handheld scanner at 400 dpi in 24-bit color.



Photo scanned with Logitech's \$508 ScanMan™ Color handheld scanner at 400 dpi in 24-bit color.

**QUESTIONS?**  
CALL OUR SCANNER EXPERTS!  
**1-800-926-7226**  
toll-free (415) 692-9061 fax (415) 692-3064

**ENVISIONS**  
Scanner Solutions Made Easy

Page 3 of 3

Features and Bundled Items:	ENVISIONS ENV256™	Logitech ScanMan™ 256	ENVISIONS ENVColor™	Logitech ScanMan™ Color
Resolution	Up to 400 dpi	Up to 400 dpi	Up to 800 dpi	Up to 400 dpi
Grayscale/Color Capability	256 Grayscales	256 Grayscales	16.7 Million Colors	16.7 Million Colors
Automerger/AutoStitch	✓	✓	✓	✓
Image Editing Software Included	Halo Desktop Imager PC Magazine's Editor's Choice	PhotoTouch by Logitech	Halo Desktop Imager PC Magazine's Editor's Choice	PhotoTouch by Logitech
Text Scanning Software Included	Perceive Personal	OmniPage Direct	Perceive Personal	OmniPage Direct
<b>Your Price</b>	<b>\$149.00</b>	<b>\$227.99*</b>	<b>\$299.00</b>	<b>\$508.28*</b>

\*Average of 3 prices quoted by Lightbulb Software stores in the San Francisco Bay Area on 3/4/96. Hand scanner bundles require 386 or higher, Windows 3.1, 4MB RAM, 5MB hard disk space free.

## Envisions' handheld scanner bundles include imaging and text software!

Automatically merge multiple scans and create posters!

HALO Desktop Imager brings full page desktop scanner power to your handheld scanner!

- Automerger assembles multiple scans easily
- Preview mode takes guess-work out of fine-tuning
- Blow up an image to 80,000% using minimal disk space
- Batch file conversion feature



Value \$119 June 16, 1992 HALO Desktop Imager

### ENV256 and ENVColor (24-bit) Scanner Solutions Include:

- Grayscale or Color Scanner
- Halo Desktop Imager
- Perceive Personal 2.1 OCR

Total Software Value \$468

ENVColor Solution Only \$299  
ENV256 Solution Only \$149  
EST-4608 EST-45508

### Scan text off the page for quick, accurate data entry!

Perceive Personal 2.1's new accuracy and speed saves time and effort when scanning text. Perceive 2.1 recognizes a variety of text styles and sizes there is no need to re-type, ever!

• Recognizes 6-24 point type without training—even mixed fonts on the same page!

• Up to 99.8% accuracy; eliminates tiresome corrections

• Recognition speed for a full page of text is a fast 15-40 secs.

based on performance of a 386/33MHz PC, with 4MB of RAM.



Value \$ 299



Included in the not pictured Halo Desktop Imager & Perceive Personal 2.1 OCR

## Now you can capture text and images on the go with Envisions' new portable handheld scanning solution!

Scan anything, anytime-anywhere! Here's all you need to connect your handheld scanner to your laptop or notebook computer through the printer port. It's easy to install because there's no need for an interface card! Envisions handscanners are busin-ess-compliant to scan directly into any open busin-ess-based application. An IBM's value!

### ENV256 and ENVColor (18-bit) Portable Scanner Solutions Include:

- Perceive Personal 2.1 OCR, Halo Imager, plus...
- Lotus Organizer, value \$149
- CardScan Business Card Software, value \$149
- ENV 18-bit Laptop Adapter, value \$99
- ScanPad, value \$20

Total Value (excluding scanner) \$885

ENV256 Portable Only \$249  
ENVColor Portable Only \$299  
EST-30788 EST-30798

May be subject to  
restricting fee

**LOTUS**  
ORGANIZER

**ENVISIONS**  
SCANNERS

**TURBO**  
Compatibility



# Product Index

## PRODUCTS FEATURED IN THIS ISSUE

FOR FREE INFORMATION ON THESE PRODUCTS, CIRCLE THE CORRESPONDING READER SERVICE NUMBER ON THE REPLY CARD ON PAGE 273.

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Compaq Computer

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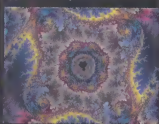
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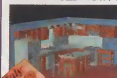
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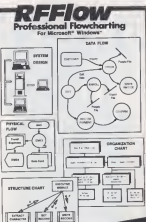
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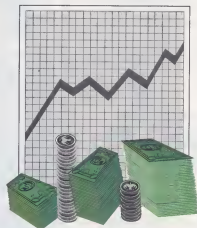
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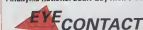
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# Did I Disable Five Security Measures or Six?

*You better ask yourself, punk, 'Do I feel lucky?'*  
*Well, punk, do you?*

"THREE STRIKES YOU'RE OUT." This was a damn president talking and it's seductive. Three violent felony convictions and you leave jail only in a coffin. Get it? Well, if you don't get it, it don't matter because ignorance of the law is no excuse and that's another good rule.

Let's hope if the federal "three strikes" rule goes through it doesn't affect any of us except to make us a tad safer. (Why should I hope it doesn't put any of you in the joint? If there are murderers and rapists reading my column, they should be stopped. Well, maybe if they really like my column and write kind letters to my editor—four strikes.)

It's hard for government to deliver real tough justice. We want the benefit of the doubt. We all read Kafka—what if it's Penn K. who's being framed for the third time? But we want justice—on the mean streets and on our computer cybergeek streets. (Al calls this the "mean superhighway.")

I went to a survivalist convention,

a trade show for Yosemite Sam—guns, dried food, and stickers for your back door that say, "There's nothing in here worth your life." I loved the entire booth with crudely illustrated books on home booby traps.

Booby traps are justice. In Texas (or someplace that to my New York tunnel-visioned ignorance seems like Texas), a guy with a shotgun popped a stranger through his back door and walked! (I sure hope the *Watchtower* had a stringer on that case.) It must be hard to pull that trigger—but booby traps make that tough decision for you. They are mechanical judge, jury, and executioner. A piece of twine connecting a trigger to a door knob is very sophisticated A.I. "The sign said, 'Keep Out!'"

You're supposed to keep your house safe for burglars or you get sued. I guess that's OK, and if I were a meter reader or a B&E guy, I'd think that was a great idea. All the same, I can't forget this diagram for making a toaster blow up if

a "safe switch" isn't touched first. (I don't know how many criminals break in and prepare a Thomas', but if they do . . .) It was ingenious and goofy—a toaster not to be messed with. (I'll beg PC/C to print the maiming toaster diagram. They'll crybaby that it's irresponsible and doesn't have enough to do with computers. But, hey, if you installed OS/2, you don't need my help blowing up a toaster.)

What about booby traps, Trojan horses, bombs, and even viruses in our geek world? Say the client doesn't pay the bill—the programmer either does something to stop, or does nothing to stop, some hidden bugger. Once activated, the evil thurman goes to work, putting up annoying messages or erasing the "stolen" code. It can even crash the machine or erase data. I have friends good enough to write code that will blow up your toaster. Is it OK to shut down Revlon in Toronto because you know in your heart that they owe you money?

Shutting down a computer is not blowing off someone's good toast-making hand, but it still bothers me. I love the elegance of "instant justice" written into the product itself, and I dig picturing software developers starring in *Death Wish VII*. But when I watch a vigilante flick, I'm secretly identifying with the bleeding heart idealist who says, "You can't take the law into your own hands!"

And then the wimp gets punched in the face and his toaster blows up. ■

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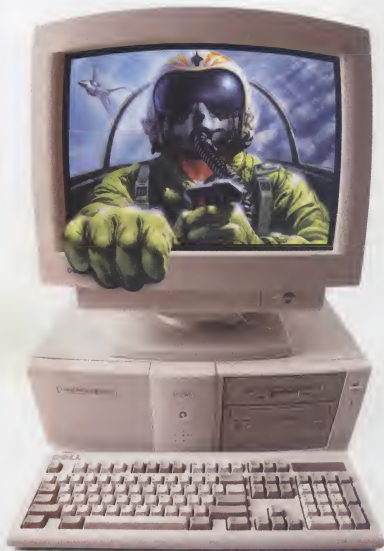
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